7. Occupied Bandwidth

7.1 Test Specification

FCC Part 2, Section 1049

7.2 Test Procedure

The E.U.T. was set to the applicable test frequency with modulation. The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator (at the output test) and an appropriate coaxial cable. The OBW function (99%) was used for this evaluation.
Occupied bandwidth measured was repeated for each modulation and for each declared BW.

7.3 Test Results

Modulation	Sub-Band	BW (MHz)	Operation Frequency (MHz)	Measurement (MHz)
QPSK	Low	5.0	2307.5	4.6
	Low	5.0	2312.5	4.6
	Low	10.0	2310.0	9.2
	High	5.0	2352.5	4.6
	High	5.0	2357.5	4.6
	High	10.0	2355.0	9.2
16QAM	Low	5.0	2307.5	4.6
	Low	5.0	2312.5	4.6
	Low	10.0	2310.0	9.2
	High	5.0	2352.5	4.6
	High	5.0	2357.5	4.6
	High	10.0	2355.0	9.2
64QAM	Low	5.0	2307.5	4.6
	Low	5.0	2312.5	4.6
	Low	10.0	2310.0	9.2
	High	5.0	2352.5	4.6
	High	5.0	2357.5	4.6
	High	10.0	2355.0	9.2

Table 1 Occupied Bandwidth Test Results

See additional information in *Figure 178* to *Figure 195*.

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: _____ Date: 18.05.15

Typed/Printed Name: M. Zohar

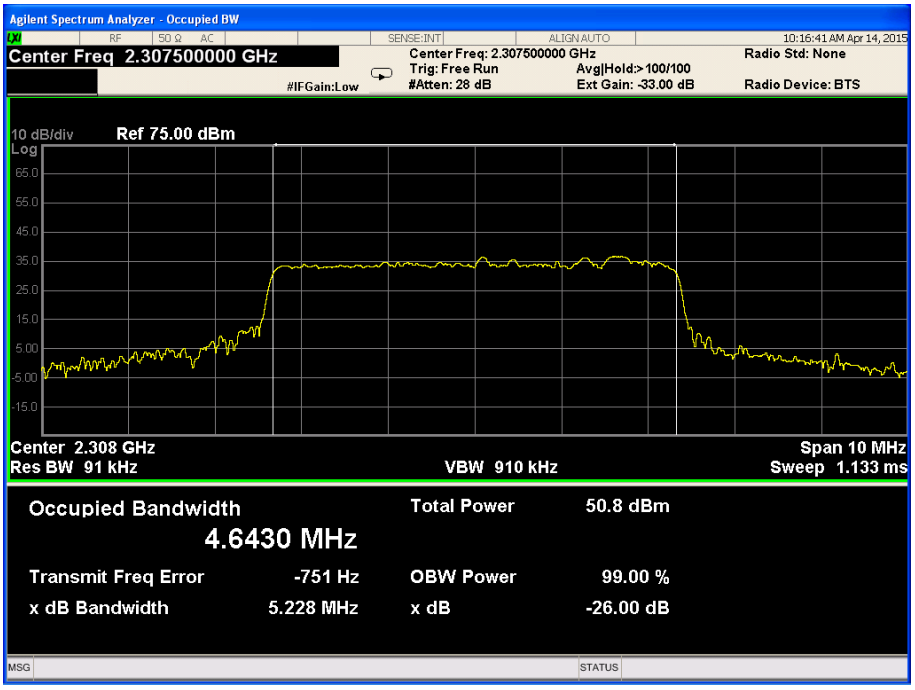


Figure 1 Occupied Bandwidth QPSK, Freq. 2307.5MHz, BW 5MHz

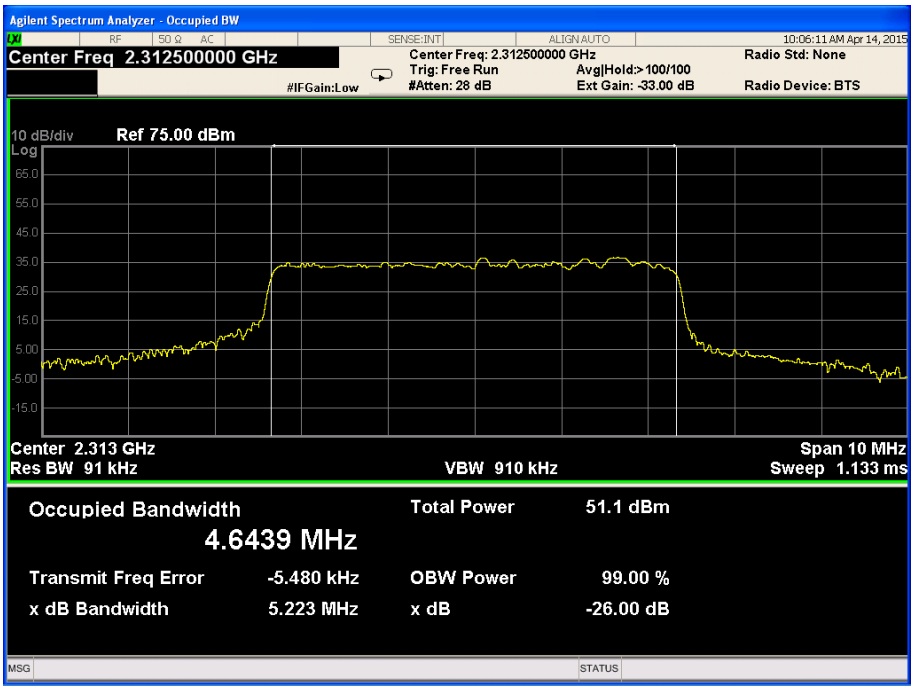


Figure 2 Occupied Bandwidth QPSK, Freq. 2312.5MHz, BW 5MHz

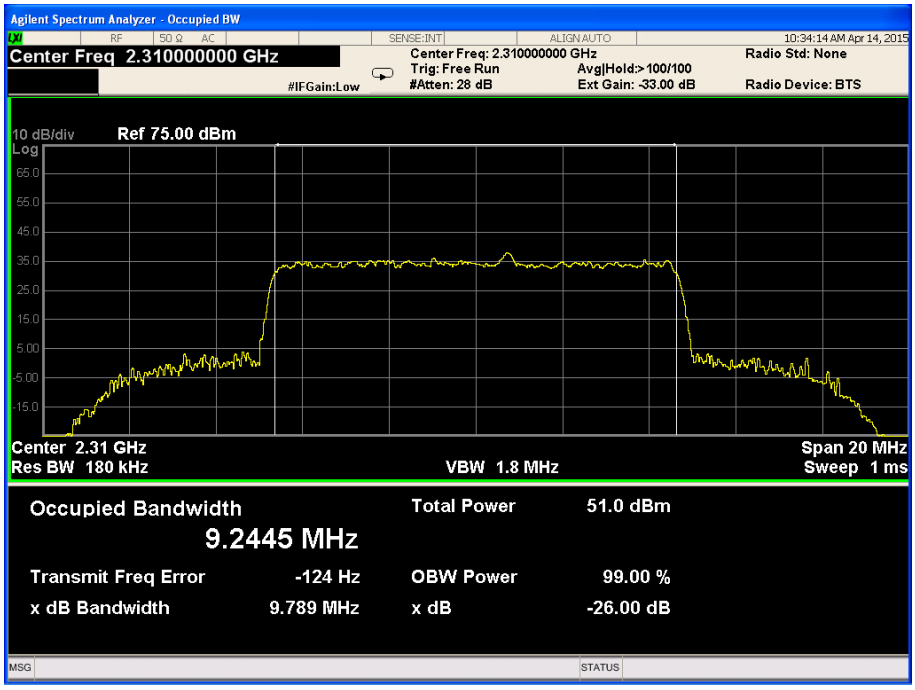


Figure 3 Occupied Bandwidth QPSK, Freq. 2310.0MHz, BW 10MHz

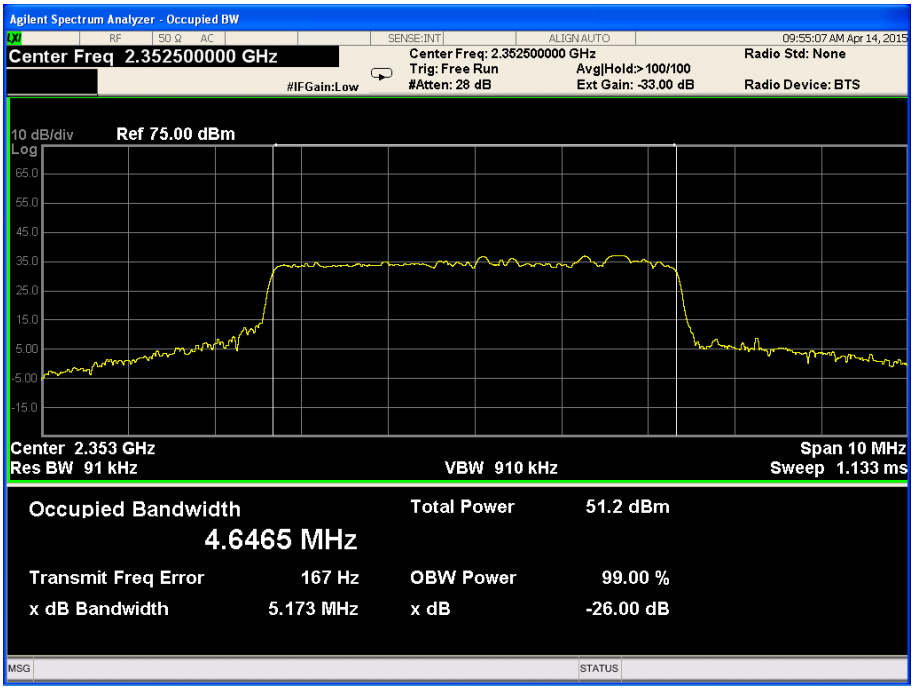


Figure 4 Occupied Bandwidth QPSK, Freq. 2352.5MHz, BW 5MHz

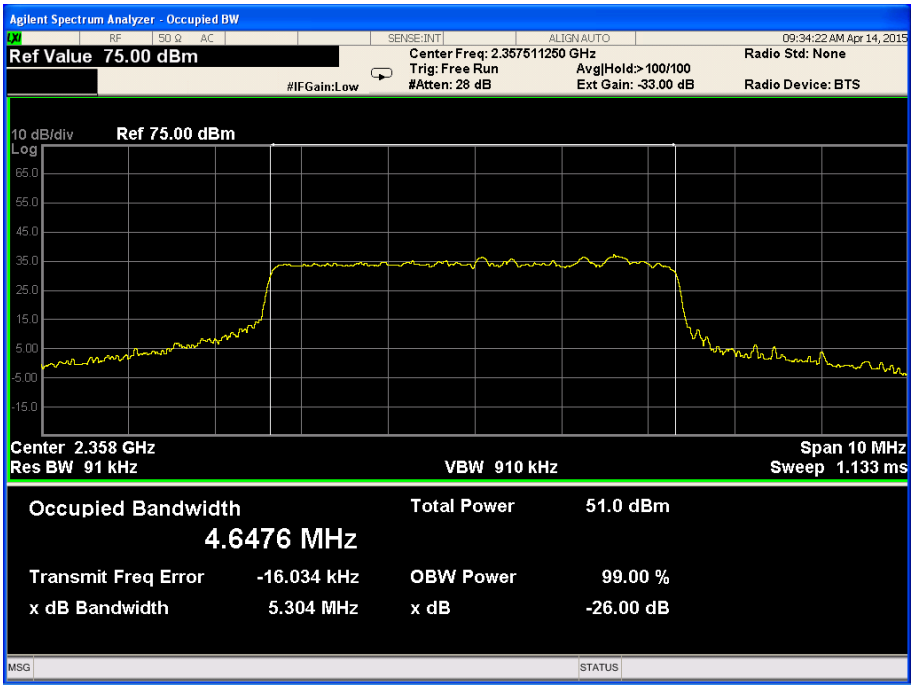


Figure 5 Occupied Bandwidth QPSK, Freq. 2357.5MHz, BW 5MHz

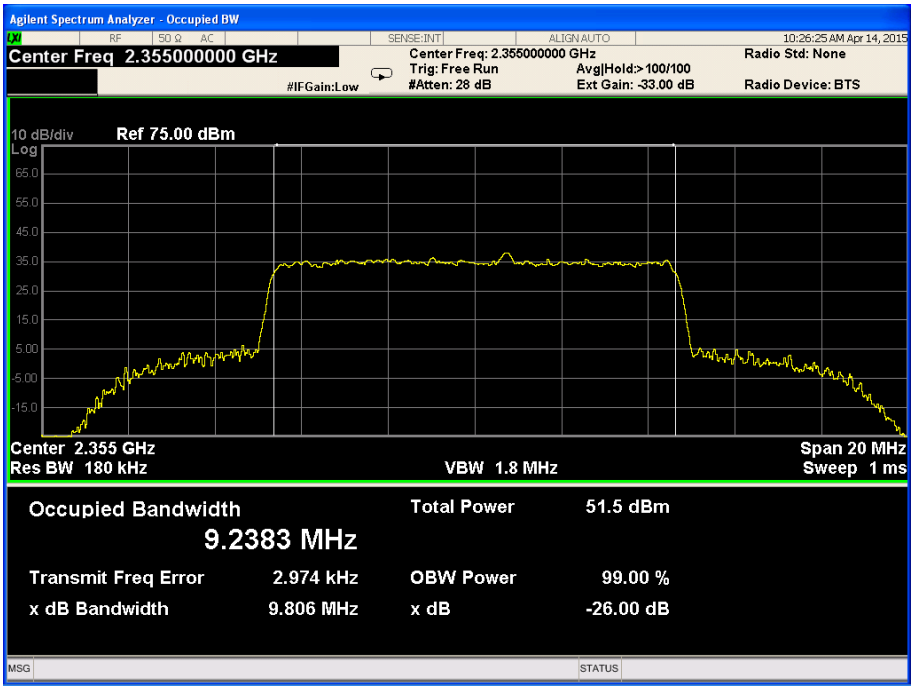


Figure 6 Occupied Bandwidth QPSK, Freq. 2355.0MHz, BW 10MHz

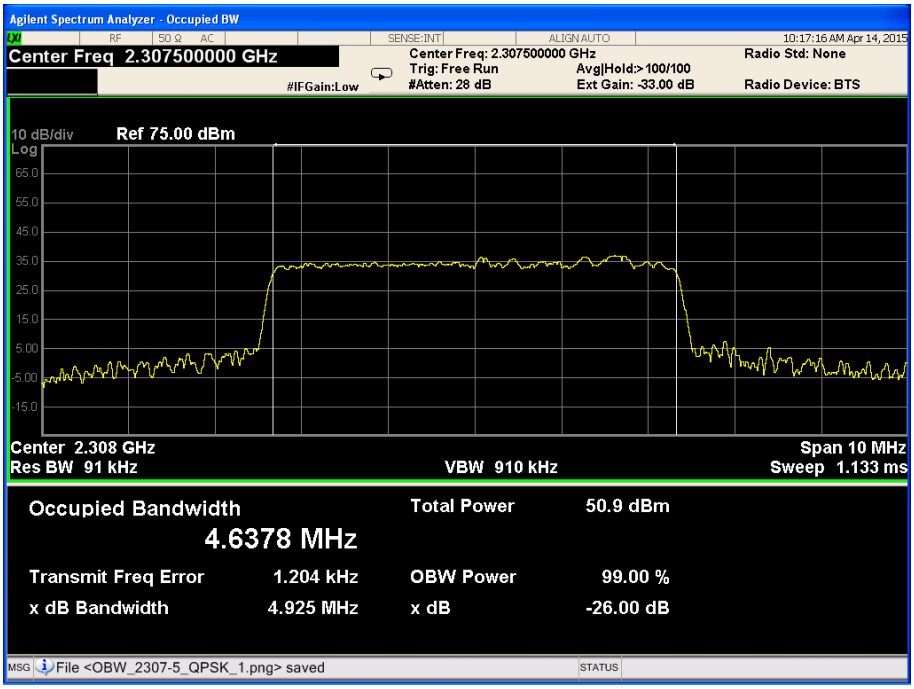


Figure 7 Occupied Bandwidth 16QAM, Freq. 2307.5MHz, BW 5MHz

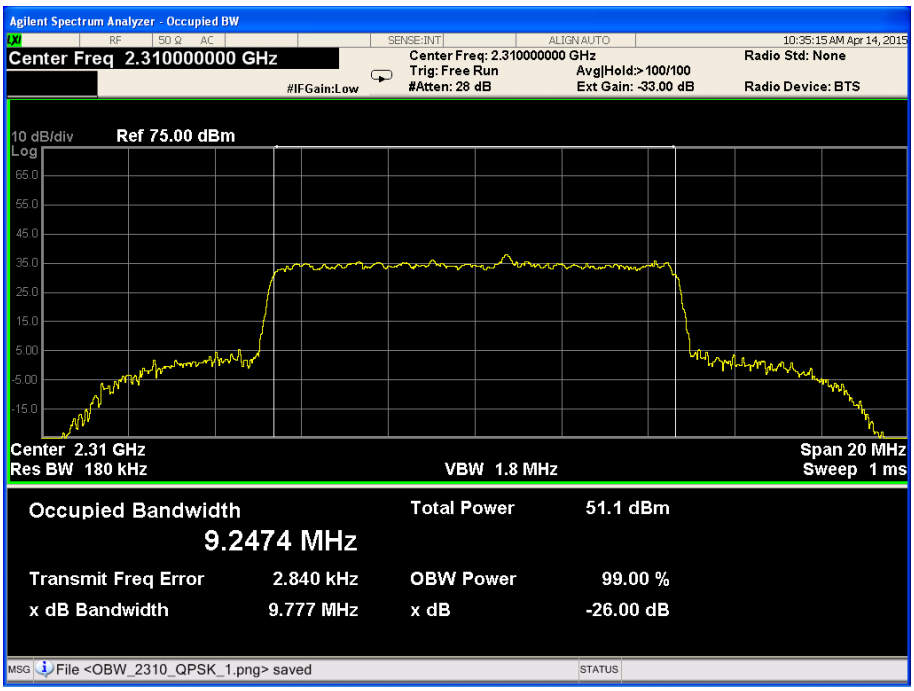


Figure 8 Occupied Bandwidth 16QAM, Freq. 2310.0MHz, BW 10MHz

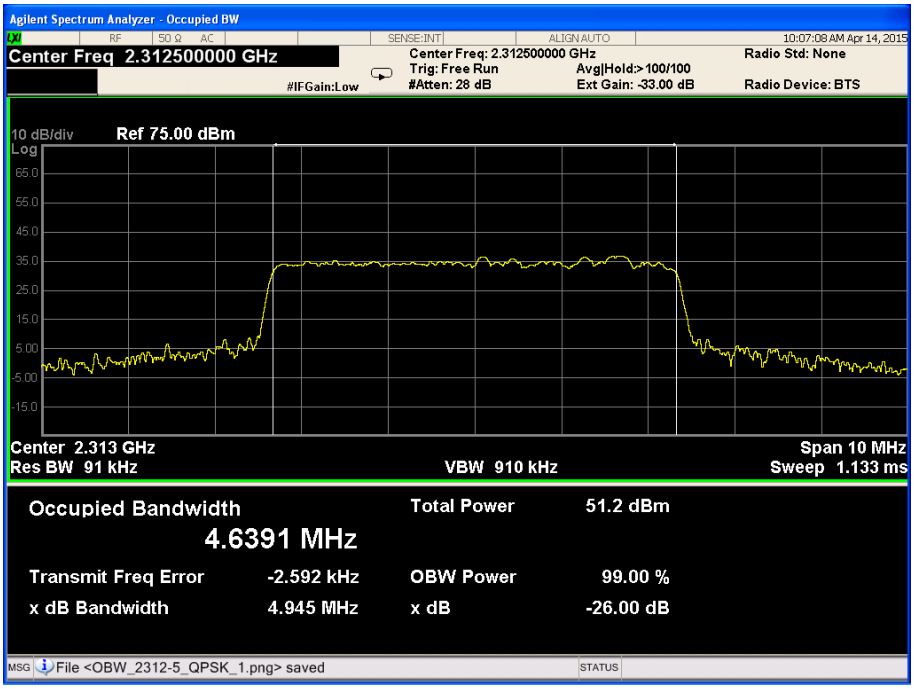


Figure 9 Occupied Bandwidth 16QAM, Freq. 2312.5MHz, BW 5MHz

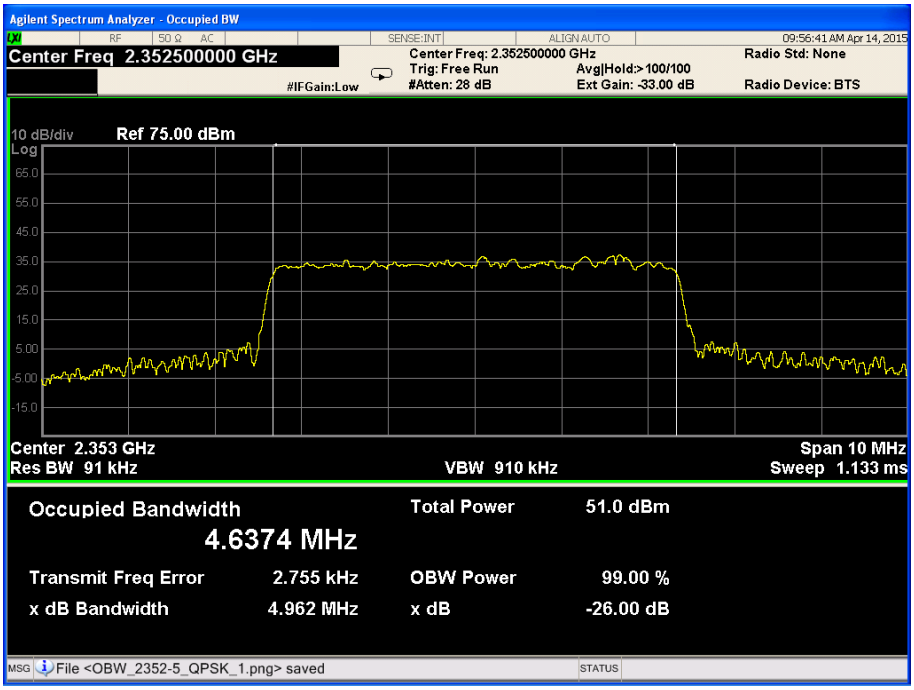


Figure 10 Occupied Bandwidth 16QAM, Freq. 2352.5MHz, BW 5MHz

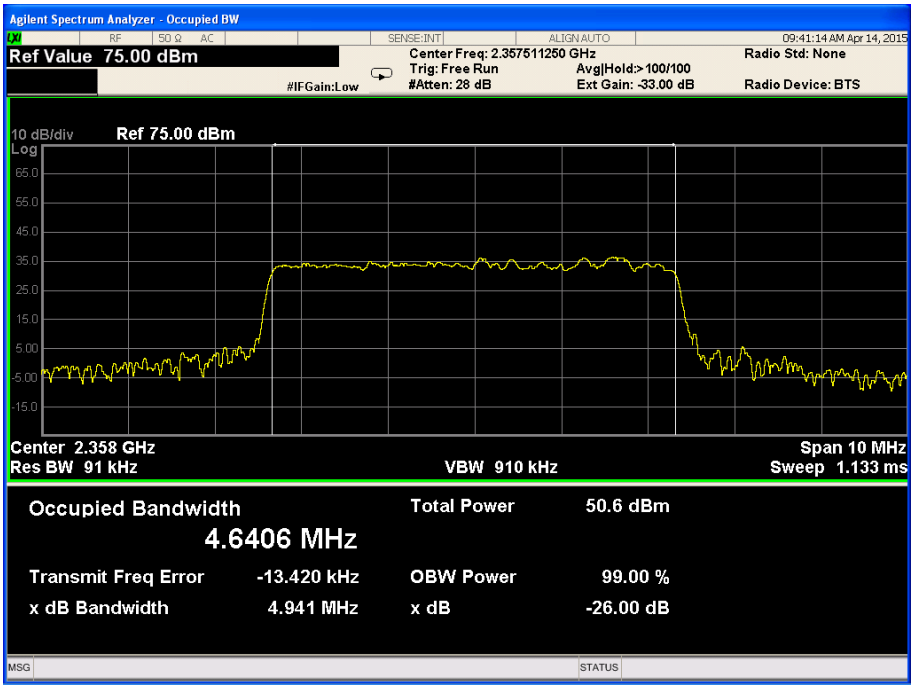


Figure 11 Occupied Bandwidth 16QAM, Freq. 2357.5MHz, BW 5MHz

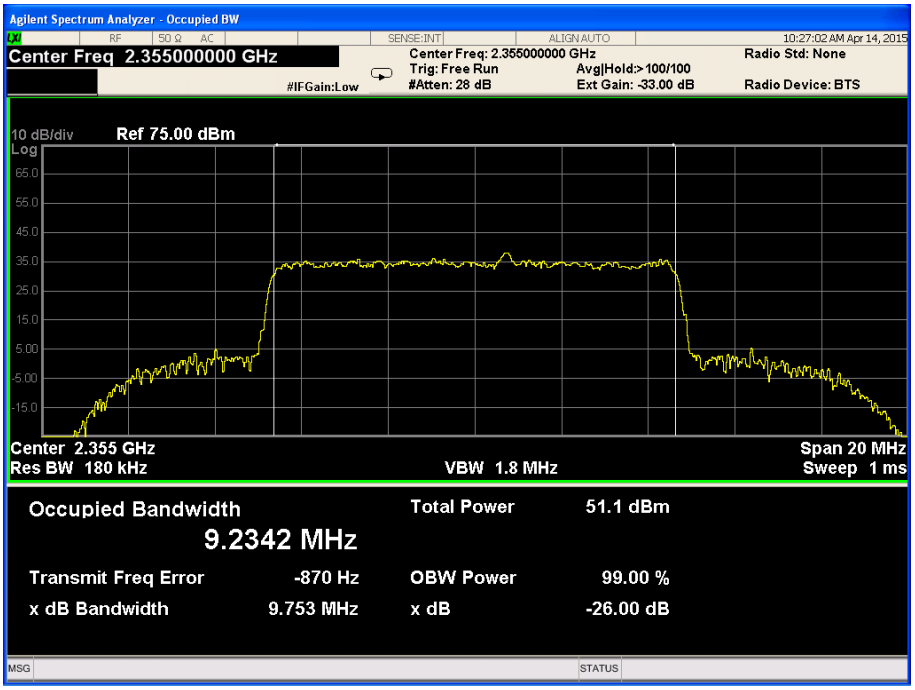


Figure 12 Occupied Bandwidth 16QAM, Freq. 2355.0MHz, BW 10MHz

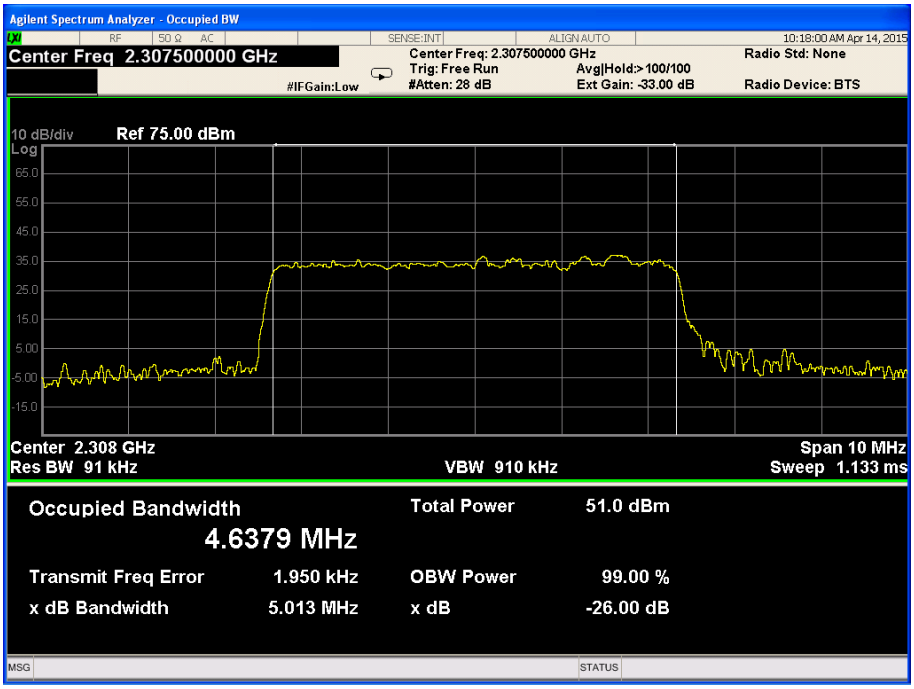


Figure 13 Occupied Bandwidth 64QAM, Freq. 2307.5MHz, BW 5MHz

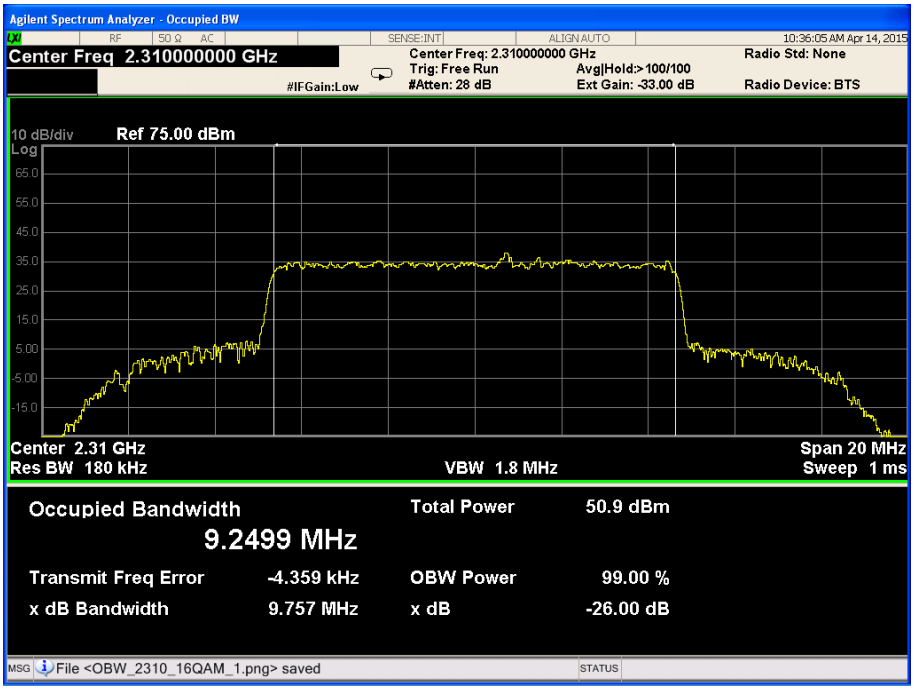


Figure 14 Occupied Bandwidth 64QAM, Freq. 2310.0MHz, BW 10MHz

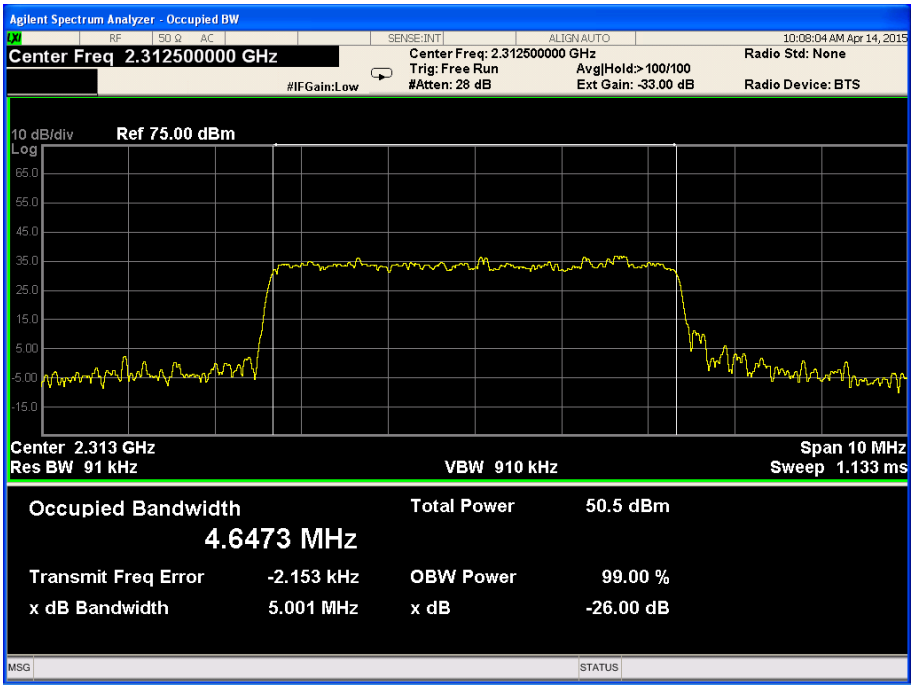


Figure 15 Occupied Bandwidth 64QAM, Freq. 2312.5MHz, BW 5MHz

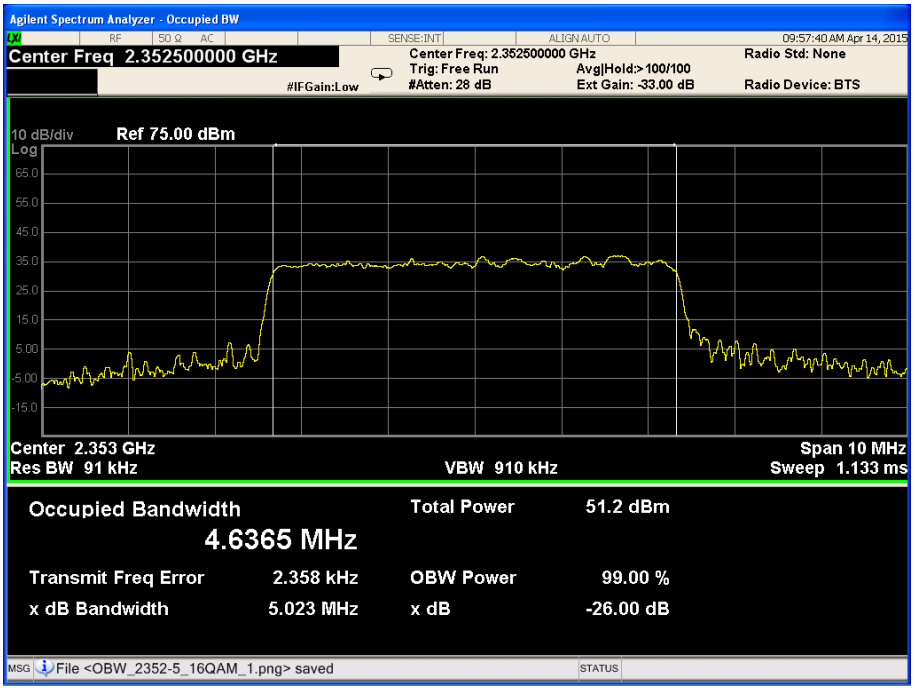


Figure 16 Occupied Bandwidth 64QAM, Freq. 2352.5MHz, BW 5MHz

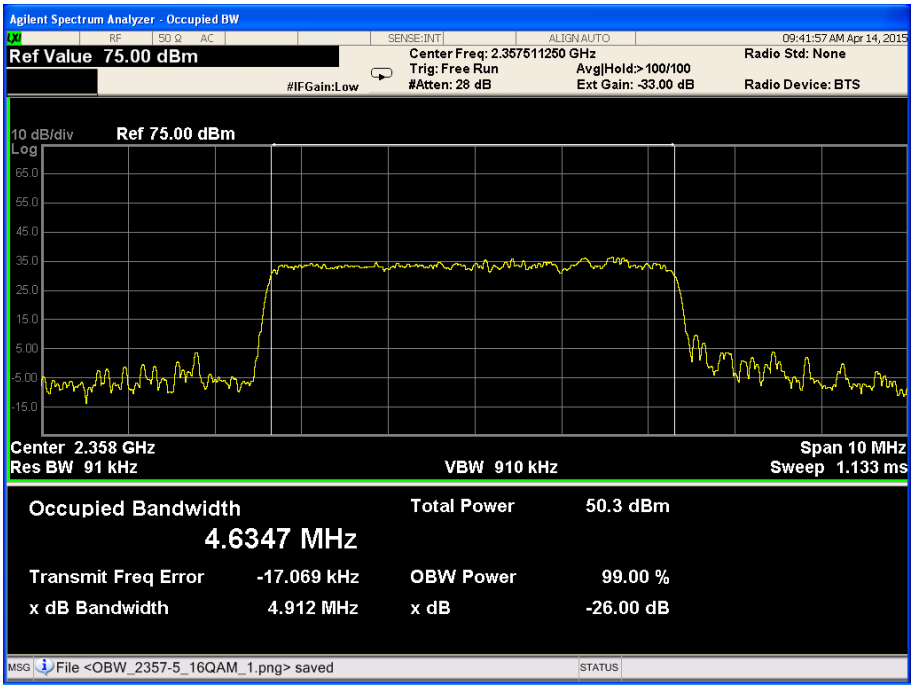


Figure 17 Occupied Bandwidth 64QAM, Freq. 2357.5MHz, BW 5MHz

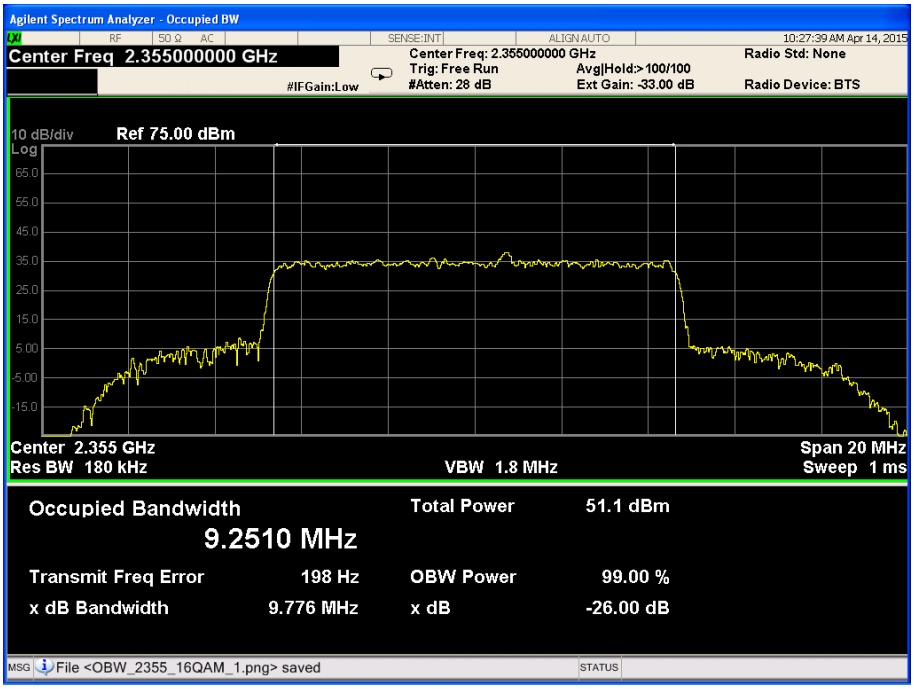


Figure 18 Occupied Bandwidth 64QAM, Freq. 2355.0, BW 10MHz

7.4 Test Equipment Used; Occupied Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	R&S	ESIB7	100120	January 4, 2015	1 year
Spectrum Analyzer	R&S	FSL6	100194	January 1, 2015	1 year
Spectrum Analyzer	HP	8592L	3826A01204	March 4, 2015	1 year
Active Loop Antenna	EMCO	6502	2950	November 4, 2014	1 year
Biconical Log Antenna	EMCO	3142B	1078	May 22, 2014	2 years
Horn Antenna	ETS	3115	6142	March 14, 2012	3 years*
Horn Antenna	A.R.A	SWH-28	1007	March 30, 2014	2 years
D.C Block	JFW	50DB-007	1-23	N/A	N/A
Coupler	PULSAR	CS 10-05-436	10	N/A	N/A
Notch Filter	TELRAD	RMC2310_2355 D10M08	10050150	N/A	N/A
MXA Signal Analyzer	Agilent	N9020A	MY46471581	February 12 2015	2 years
Spectrum Analyzer	HP	8563E	3810A8846	November 30, 2014	1 year
10 dB Attenuator	Weinschel	33-10-34	BZ5739	N/A	N/A
5 dB Attenuator	Mini-circuits	VAT-5+	15542	N/A	N/A
Power Splitter	Mini-circuits	ZN2PD-63-S+	F442300839	N/A	N/A
Attenuator	Weinschel	24-20-34	BZ144	N/A	N/A
Attenuator	Weinschel	24-20-34	BY0842	N/A	N/A
Attenuator	Weinschel	24-20-34	BY0855	N/A	N/A
Attenuator	Weinschel	24-20-34	BY0842	N/A	N/A

Signal Generator	WILTRON	6747B	278007	October 23, 2014	1 year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	August 29, 2014	1 year
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	August 22, 2014	1 year
Environmental Chamber	THERMOTRON CORP	SM 32C Mini Max	25-1030	February 24, 2015	1 year
Antenna Mast	ETS	2070-2	-	N/A	N/A
Turntable	ETS	2087	-	N/A	N/A
Mast & Table Controller	ETS/EMCO	2090	9608-1456	N/A	N/A

*Note – Extended to May 19, 2015

Figure 19 Test Equipment Used

8. Spurious Emissions at Antenna Terminals

8.1 Test Specification

FCC Part 27, Section: 53(a)(1)

RSS 195 Issue 2, April 2014 Sections 4.2, 5.6.1

8.2 Test Procedure

The power of any emission outside of the authorized operating frequency ranges (2345-2360 MHz 2305-2320MHz) must be attenuated below the transmitting power (P) by a factor of at least as specified in *Figure 197 Mask Limit Table*. The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator and an appropriate coaxial cable.

The evaluation was done in frequency band from 9K-24GHz without band edges tests, for each frequency and BW.

Frequency Band (MHz)	Calculated Factor (dBc)
f<2285.0	75+10*log(10.5)=85.2
2285.0MHz<f<2287.5MHz	72+10*log(10.5)=82.2
2287.5MHz<f<2300.0MHz	70+10*log(10.5)=80.2
2300.0MHz<f<2305.0MHz	43+10*log(10.5)=53.2
2305.0MHz<f<2320.0MHz	43+10*log(10.5)=53.2
2320.0MHz<f<2345.0MHz	75+10*log(10.5)=85.2
2345.0MHz<f<2360.0MHz	43+10*log(10.5)=53.2
2360.0MHz<f<2362.50MHz	43+10*log(10.5)=53.2
2362.5MHz<f<2365.0MHz	55+10*log(10.5)=65.2
2365.0MHz<f<2367.5MHz	70+10*log(10.5)=80.2
2367.5MHz<f<2370.0MHz	72+10*log(10.5)=82.2
2370.0<f	75+10*log(10.5)=85.2

Figure 20 Mask Limit Table

8.3 Test Results

See additional information in *Figure 198* to *Figure 262*.

JUDGEMENT: Passed

Frequency: 2357.5MHz
BW: 5MHz

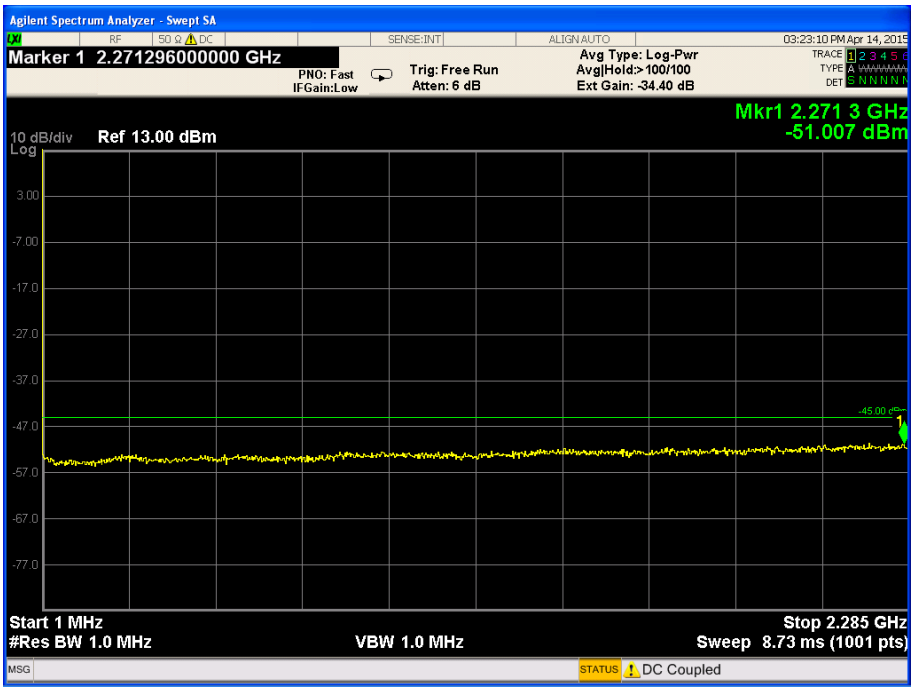


Figure 21. — 1.0 MHz-2285.0 MHz

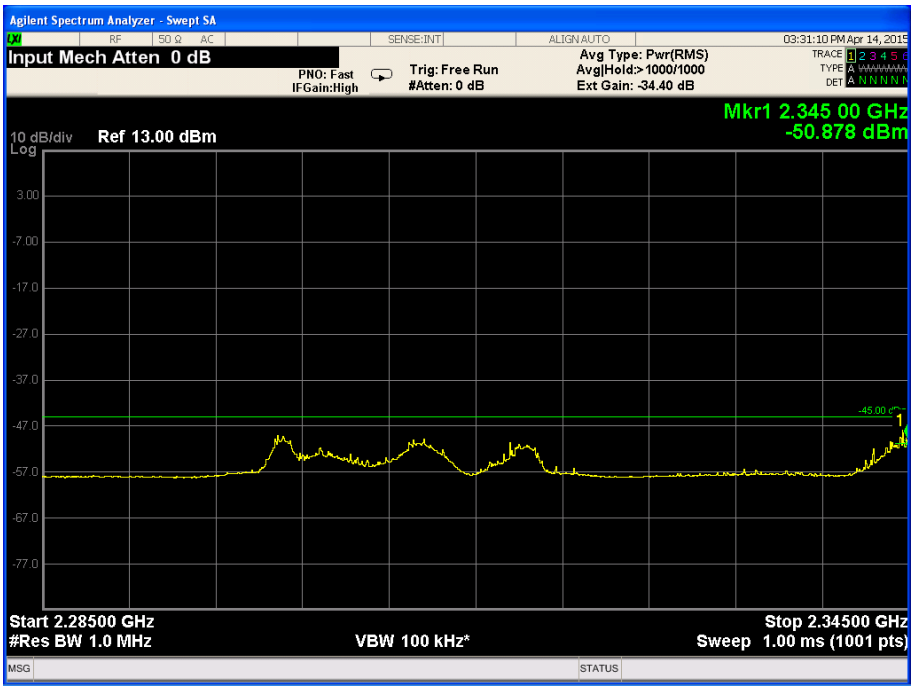


Figure 22. — 2285.0 MHz-2345.0 MHz

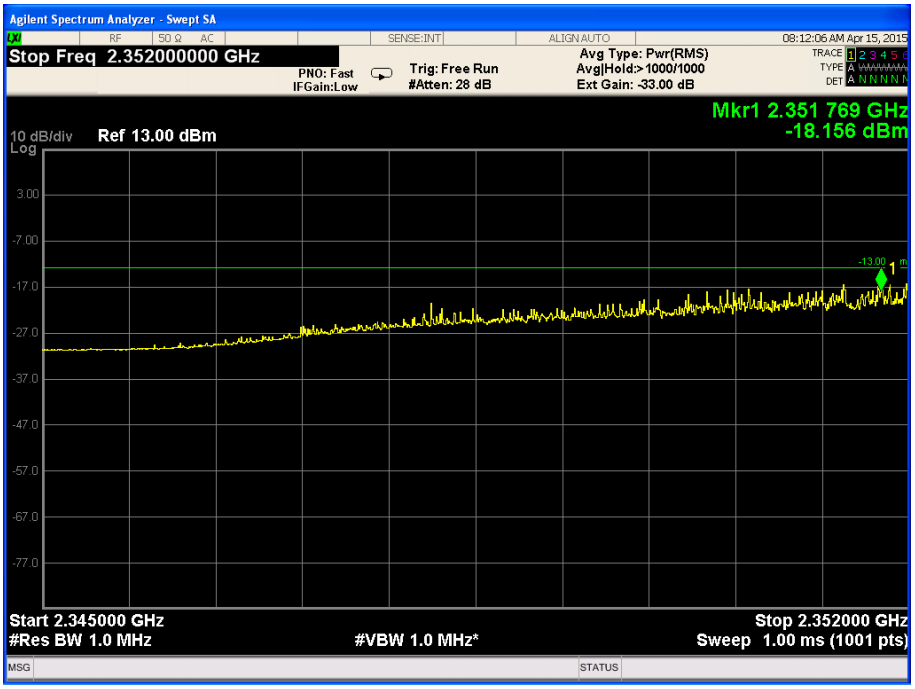


Figure 23. — 2345.0 MHz-2352.0 MHz

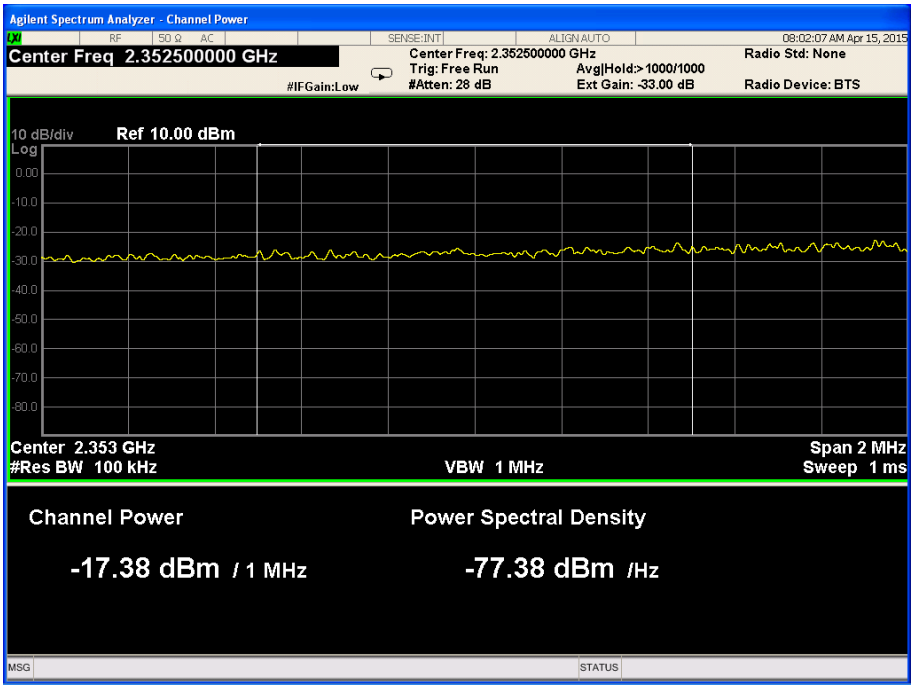


Figure 24. — 2352.0 MHz-2353.0 MHz

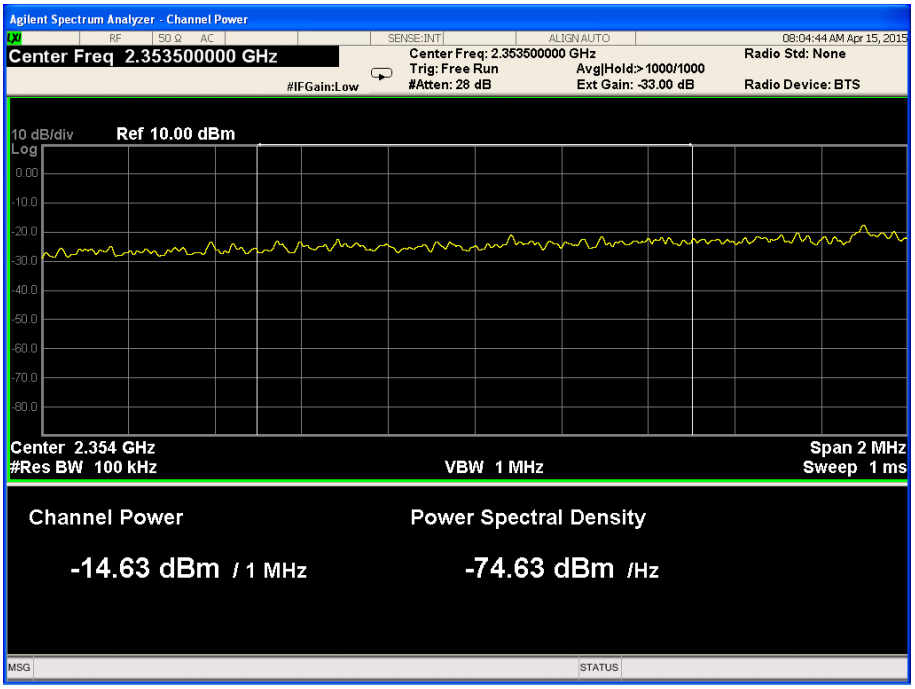


Figure 25. — 2353.0 MHz-2354.0 MHz

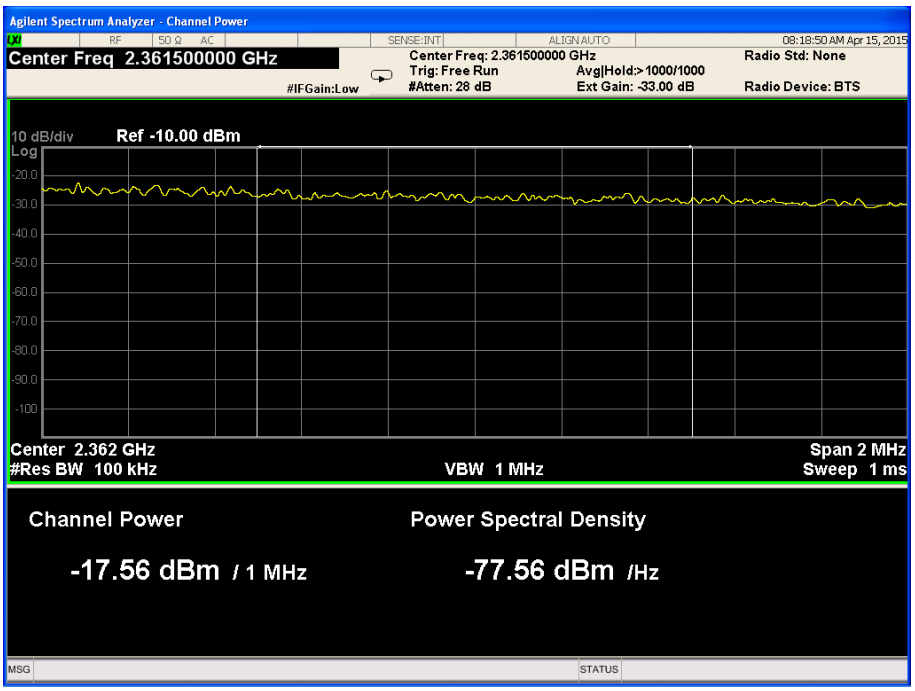


Figure 26. — 2361.0MHz-2362.0 MHz

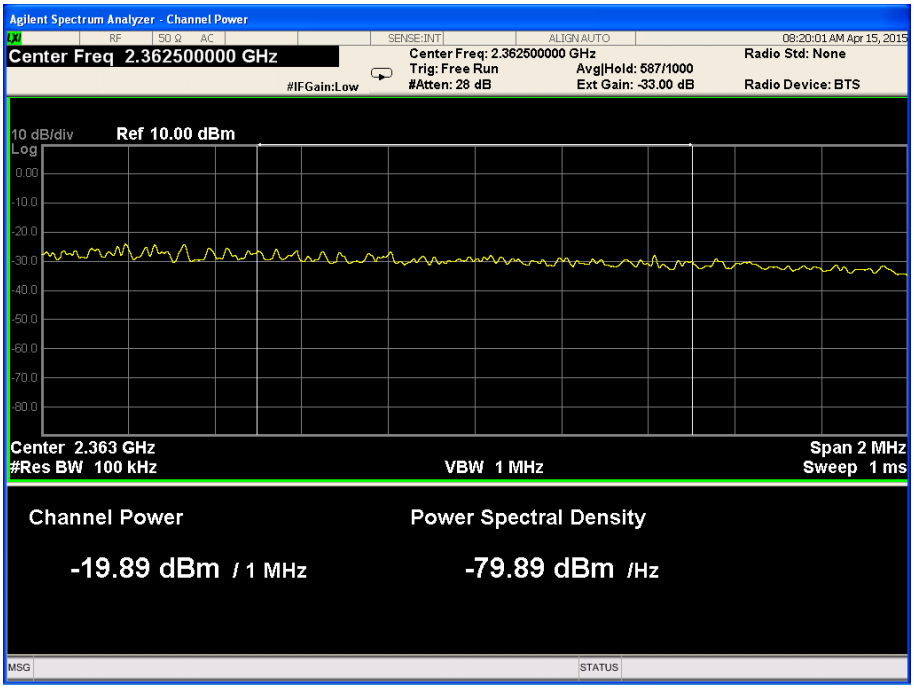


Figure 27. — 2362.0MHz-2363.0 MHz

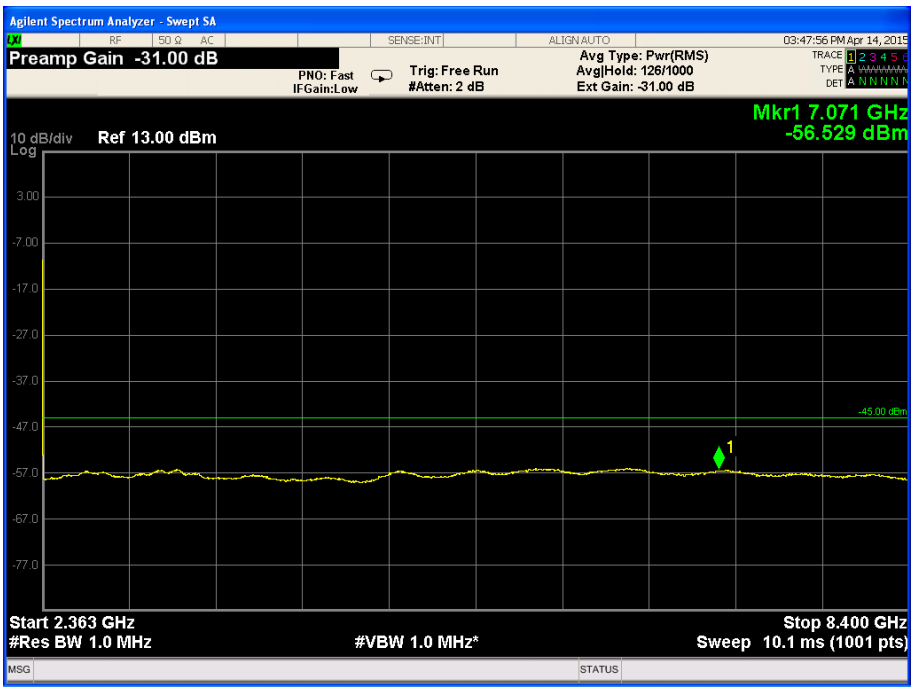


Figure 28. — 2363.0 MHz-8400.0 MHz

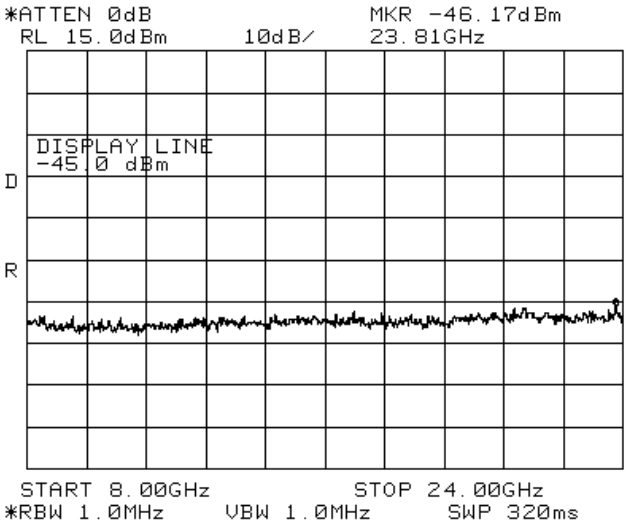


Figure 29. — 8000.0 MHz-24000.0 MHz

Frequency: 2352.5MHz
BW: 5MHz

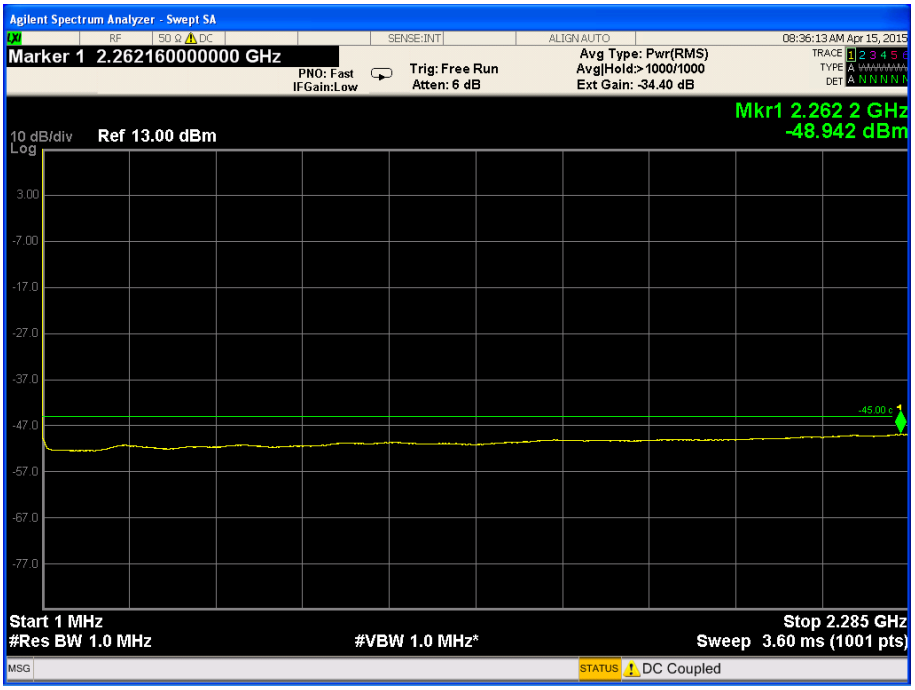


Figure 30. — 1.0 MHz-2285.0 MHz

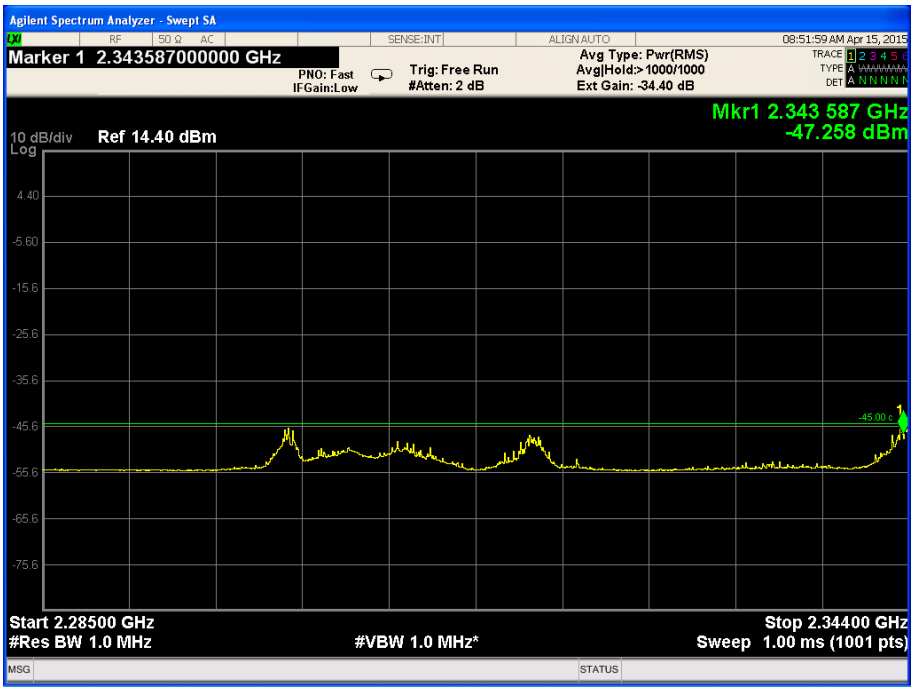


Figure 31. — 2285.0 MHz-2344.0 MHz

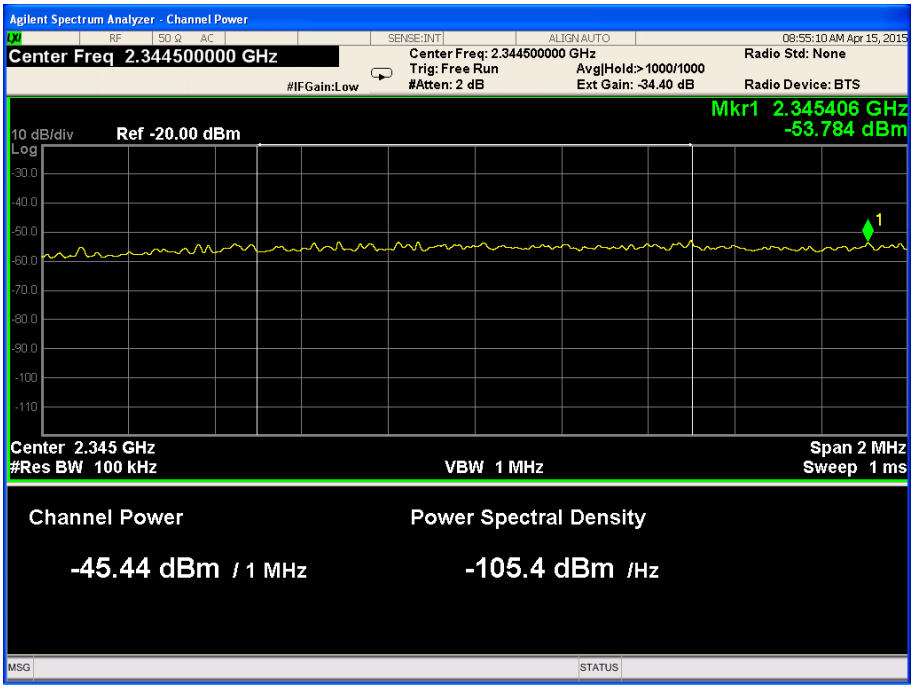


Figure 32. — 2344.0 MHz-2345.0 MHz

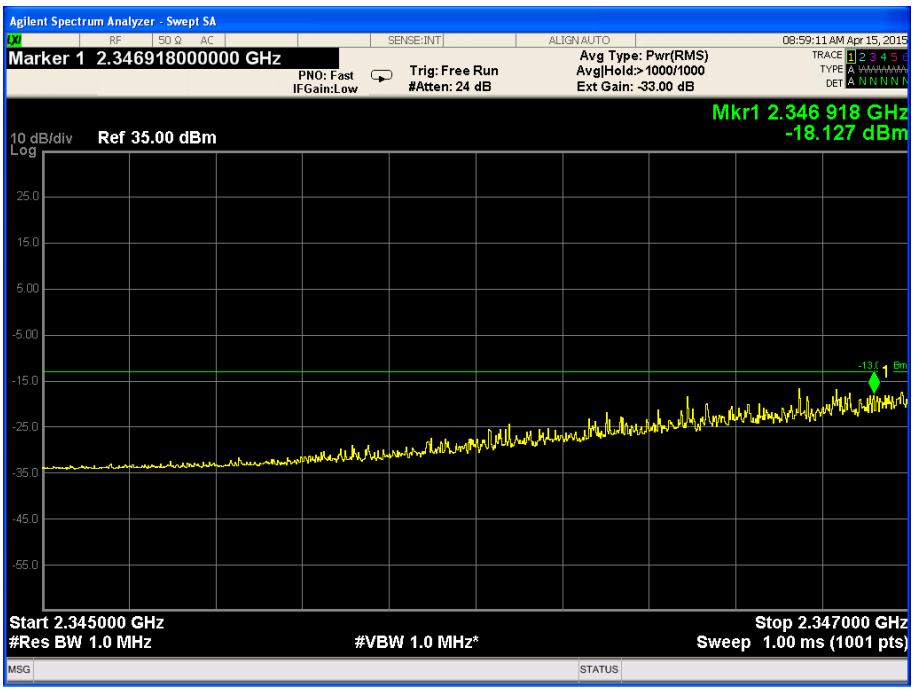


Figure 33. — 2345.0 MHz-2347.0 MHz

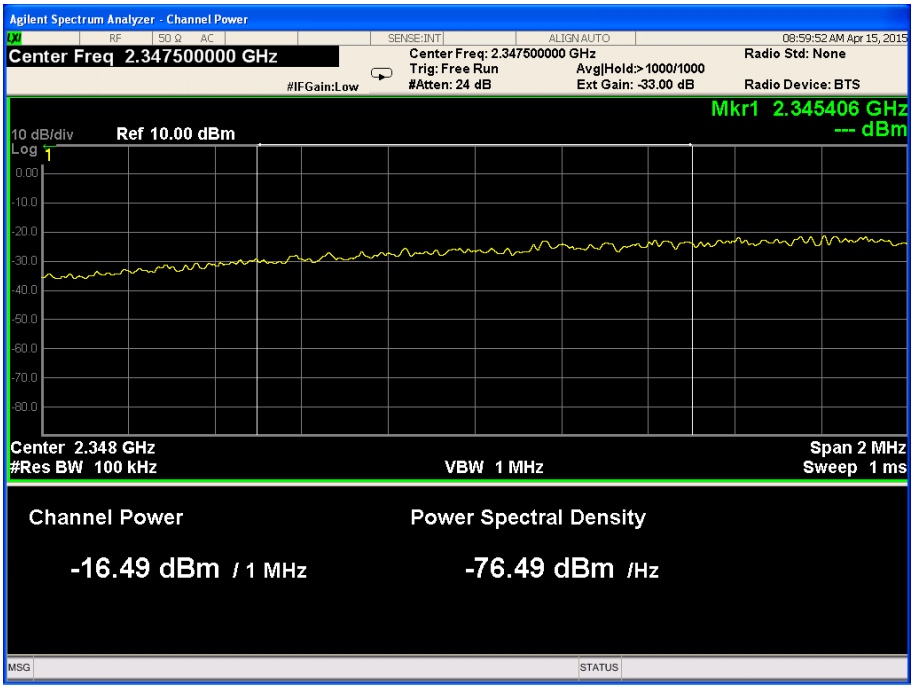


Figure 34. — 2347.0 MHz-2348.0 MHz

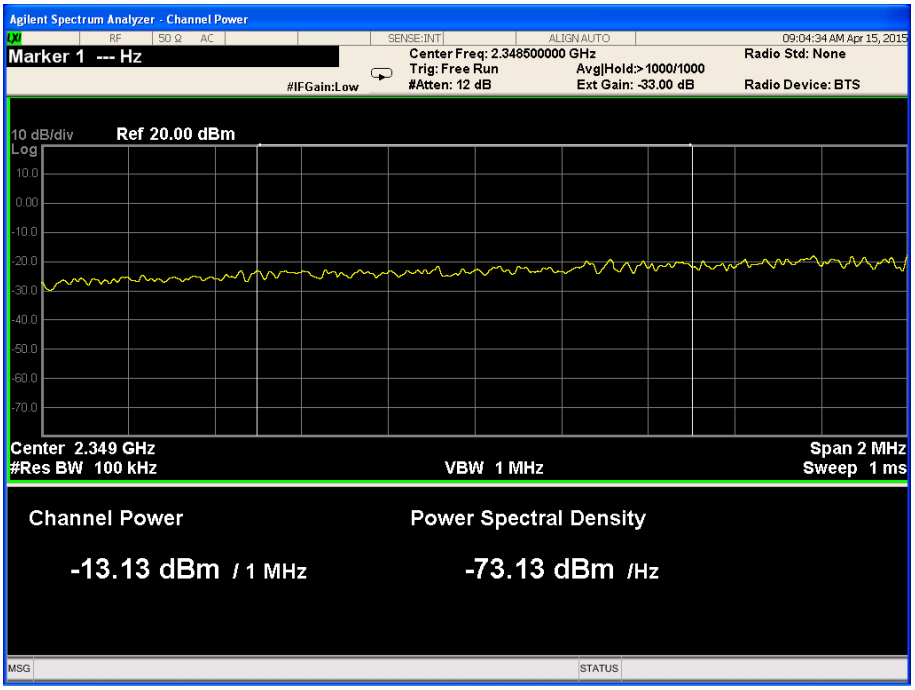


Figure 35. — 2348.0 MHz-2349.0 MHz

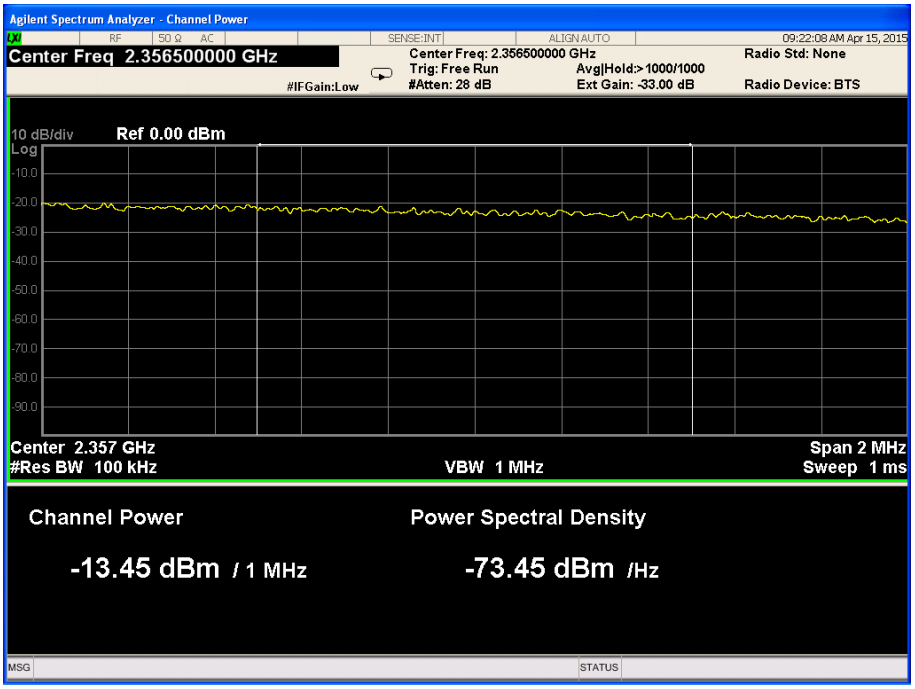


Figure 36. — 2356.0 MHz-2357.0 MHz

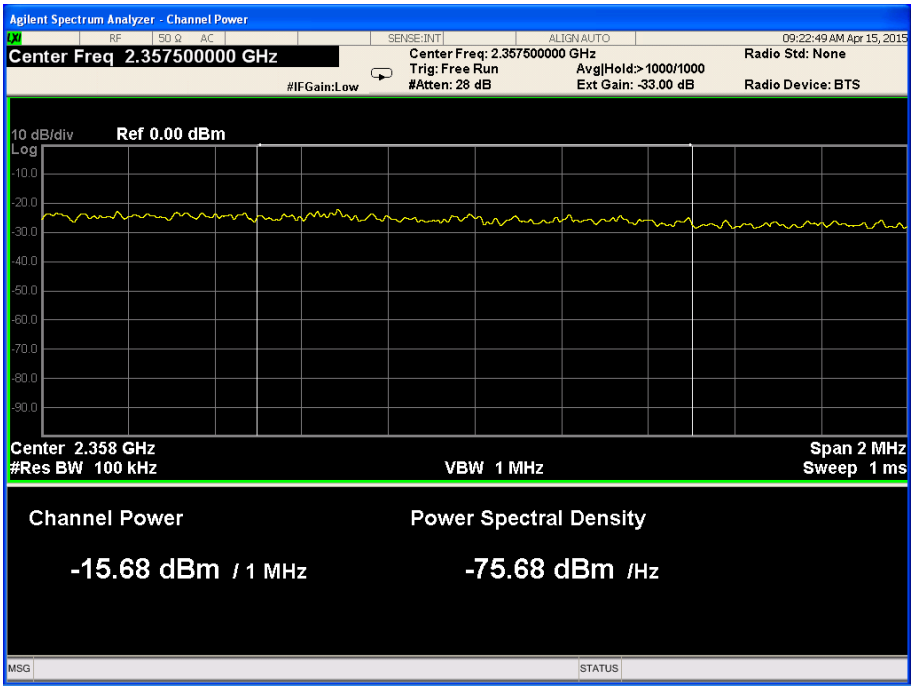


Figure 37. — 2357.0 MHz-2358.0 MHz

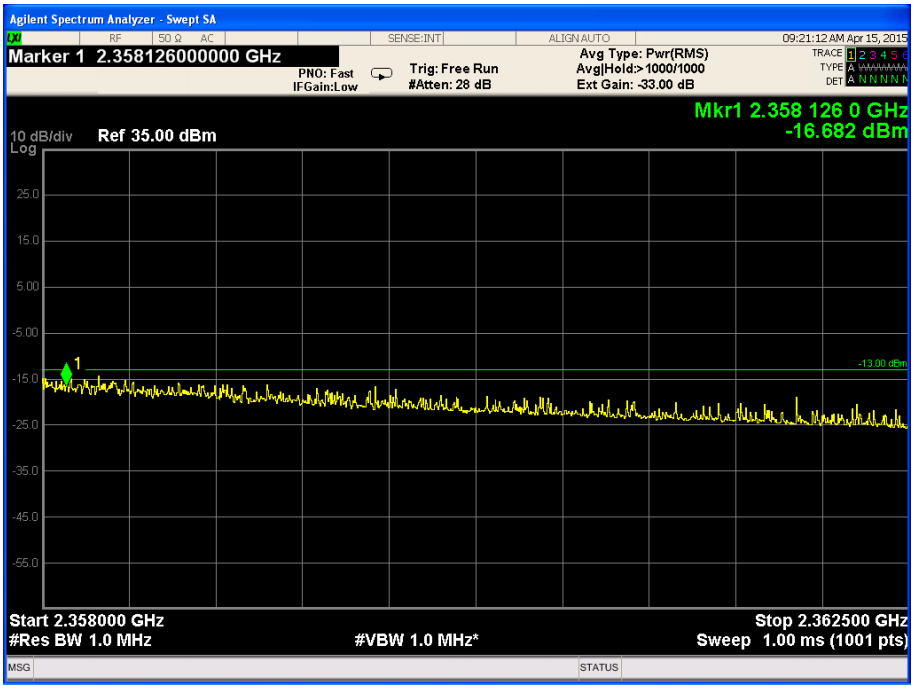


Figure 38. — 2358.0 MHz-2362.5 MHz

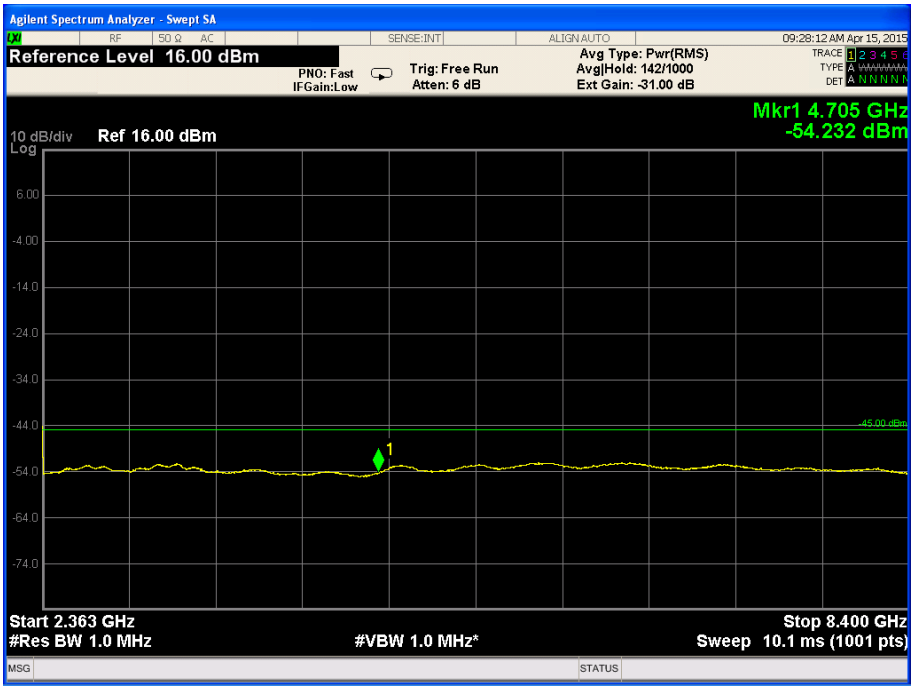


Figure 39. — 2362.5.0 MHz-8400.0 MHz

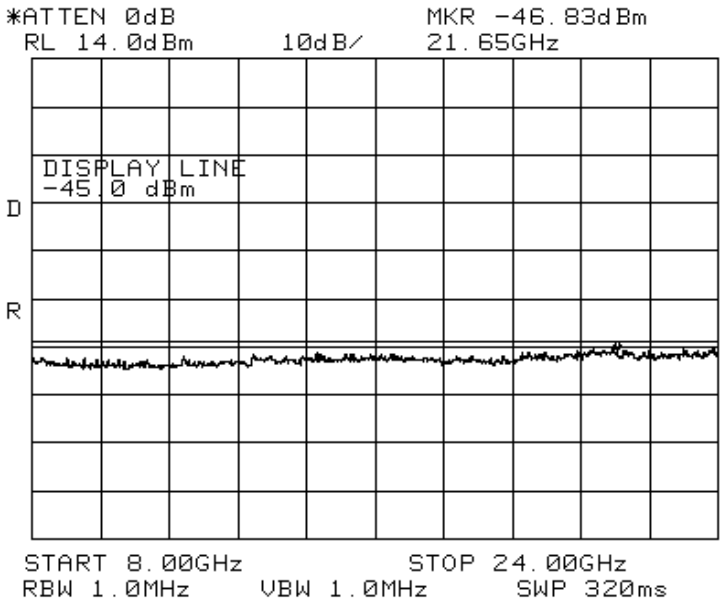


Figure 40. — 8000.0 MHz-24000.0 MHz

Frequency: 2312.5MHz
Bandwidth: 5MHz

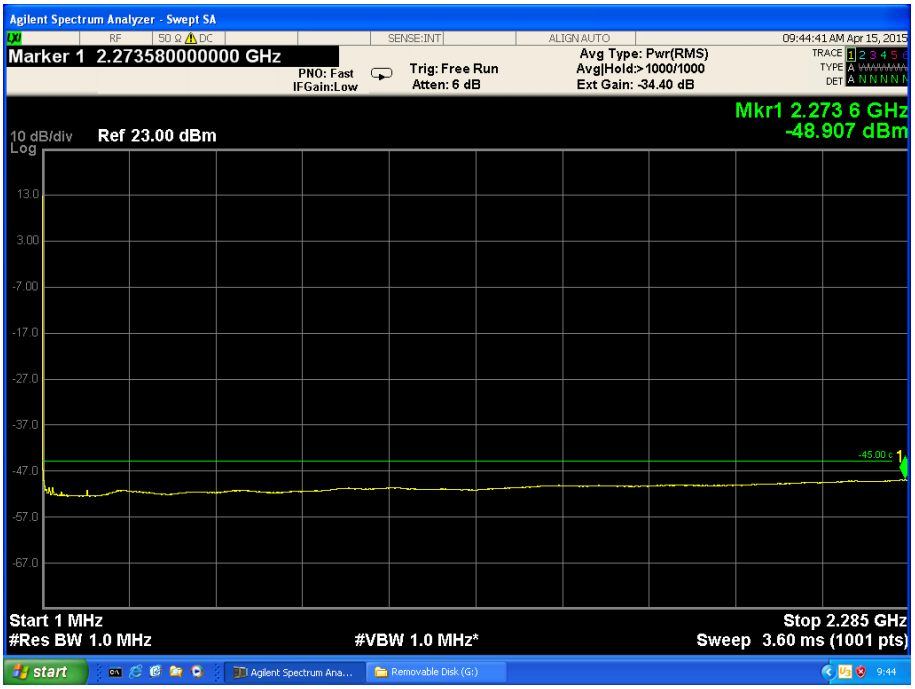


Figure 41. — 1.0 MHz-2285.0 MHz

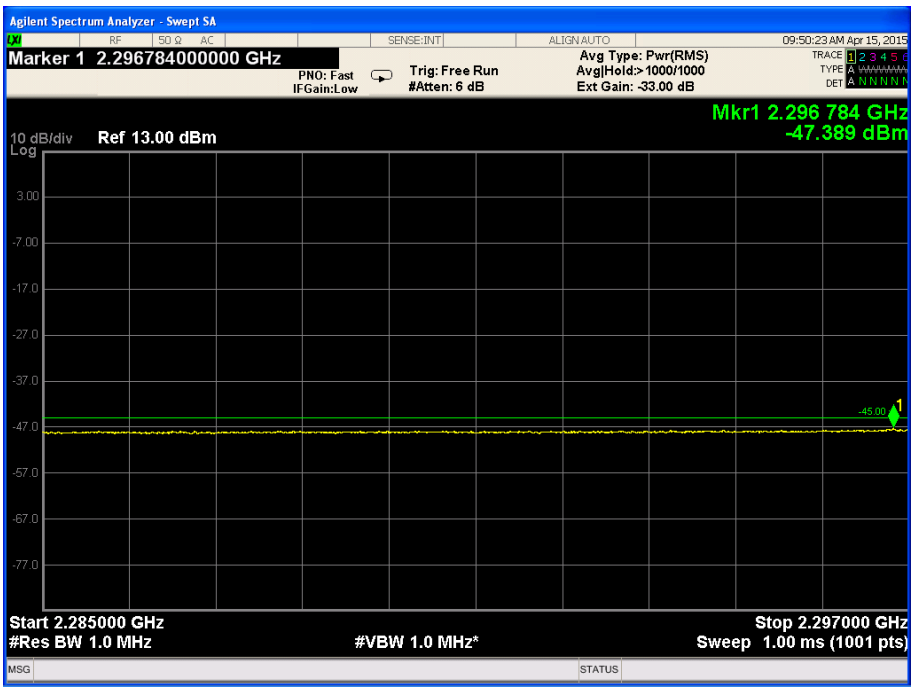


Figure 42. — 2285.0 MHz-2297.0 MHz

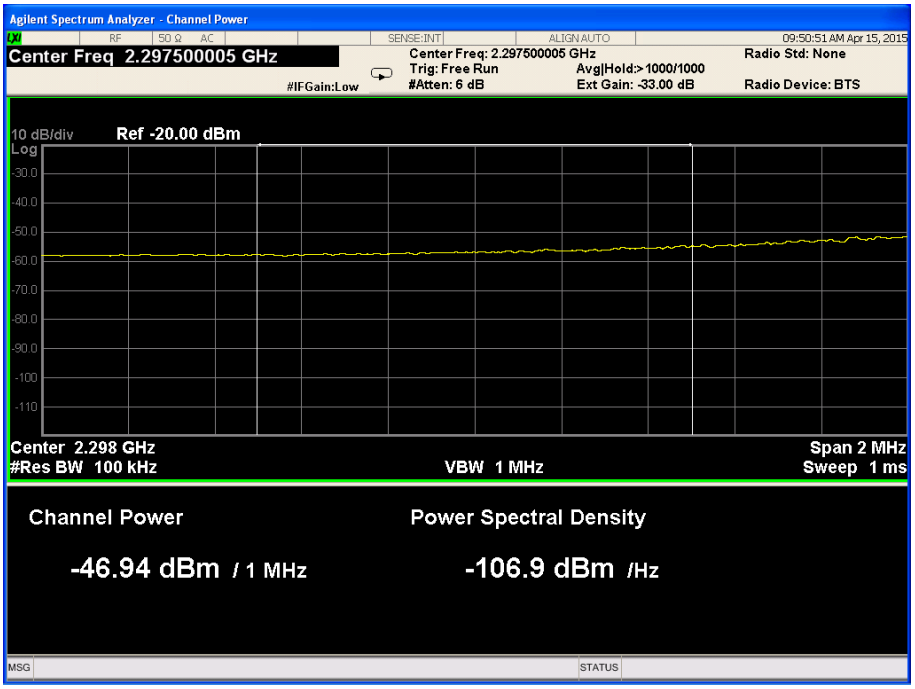


Figure 43. — 2297.0 MHz-2298.0 MHz

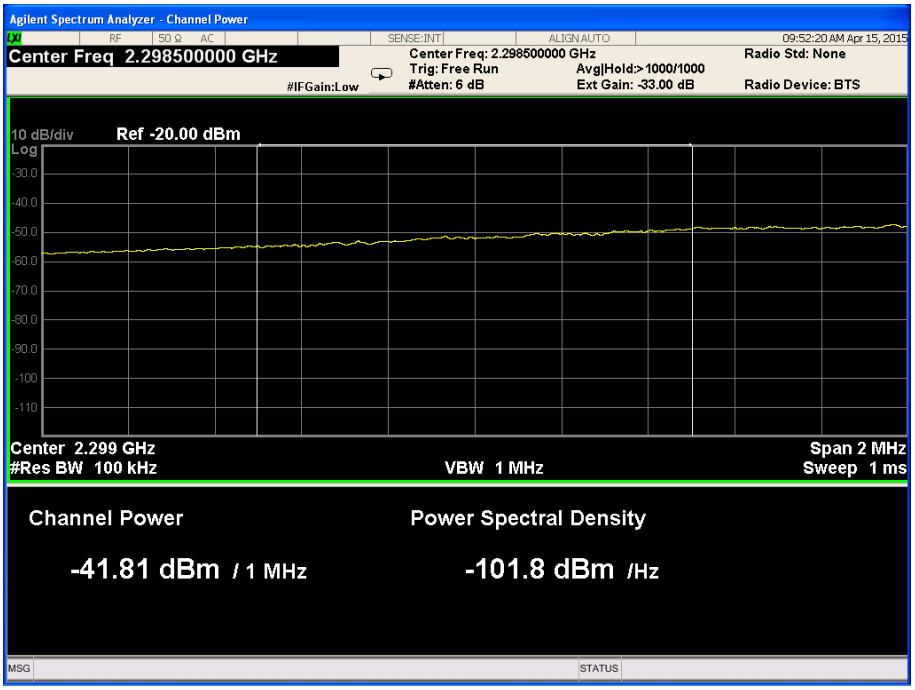


Figure 44. — 2298.0 MHz-2299.0 MHz

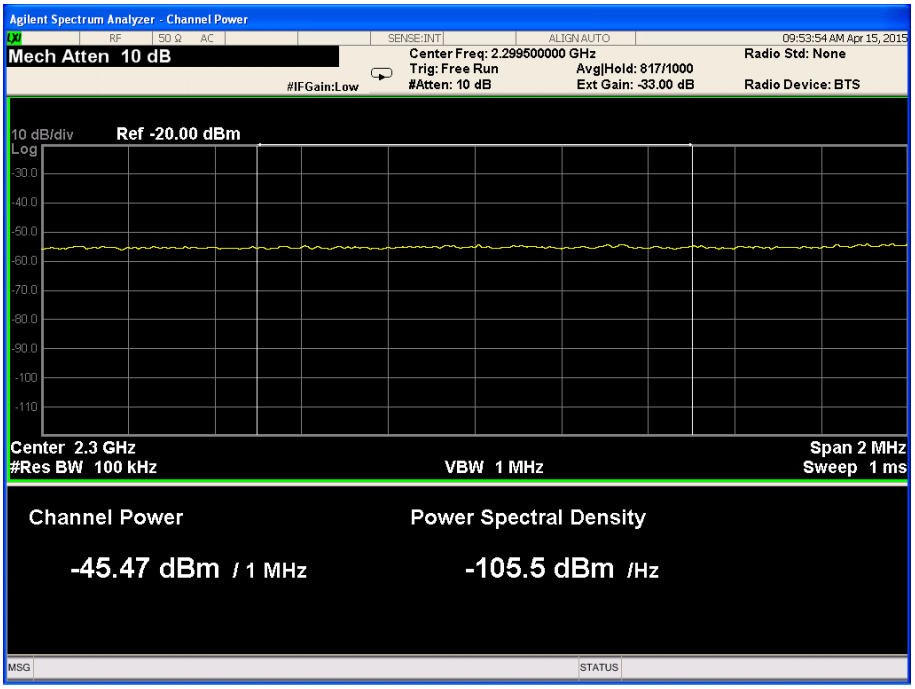


Figure 45. — 2299.0 MHz-2300.0 MHz

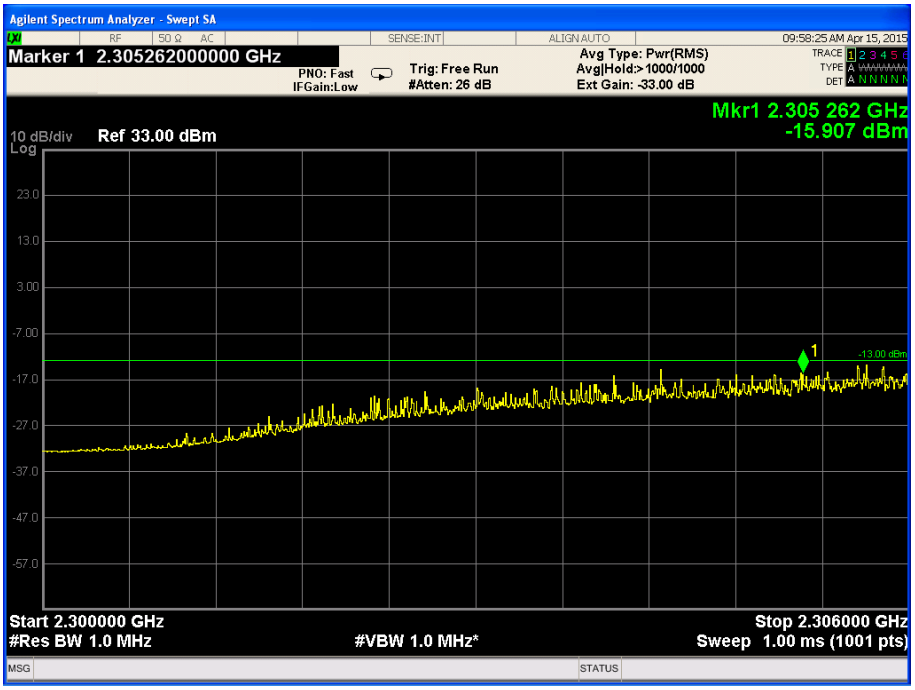


Figure 46. — 2300.0 MHz-2306.0 MHz

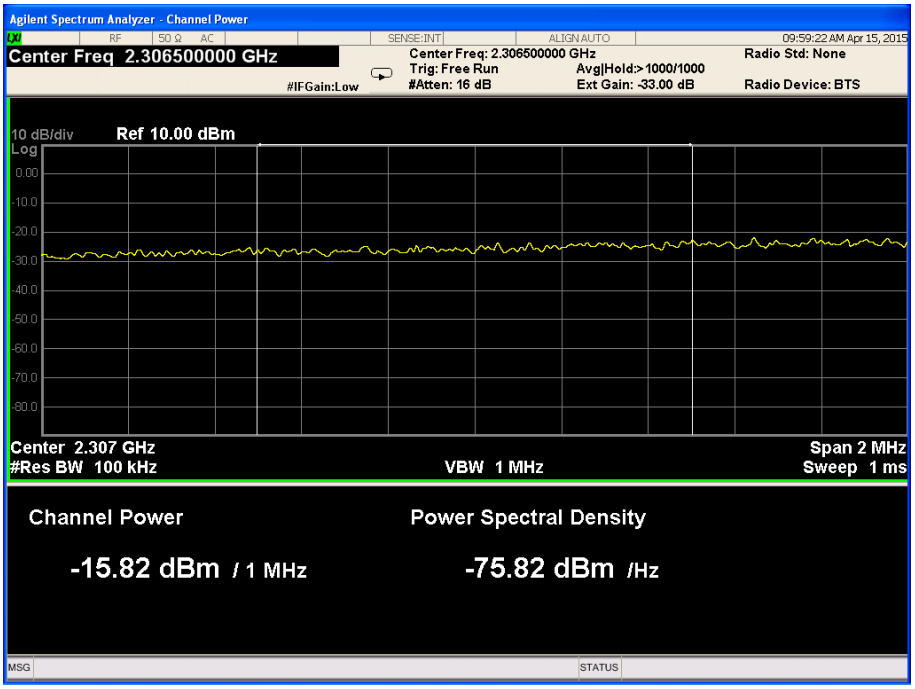


Figure 47. — 2306.0 MHz-2307.0 MHz

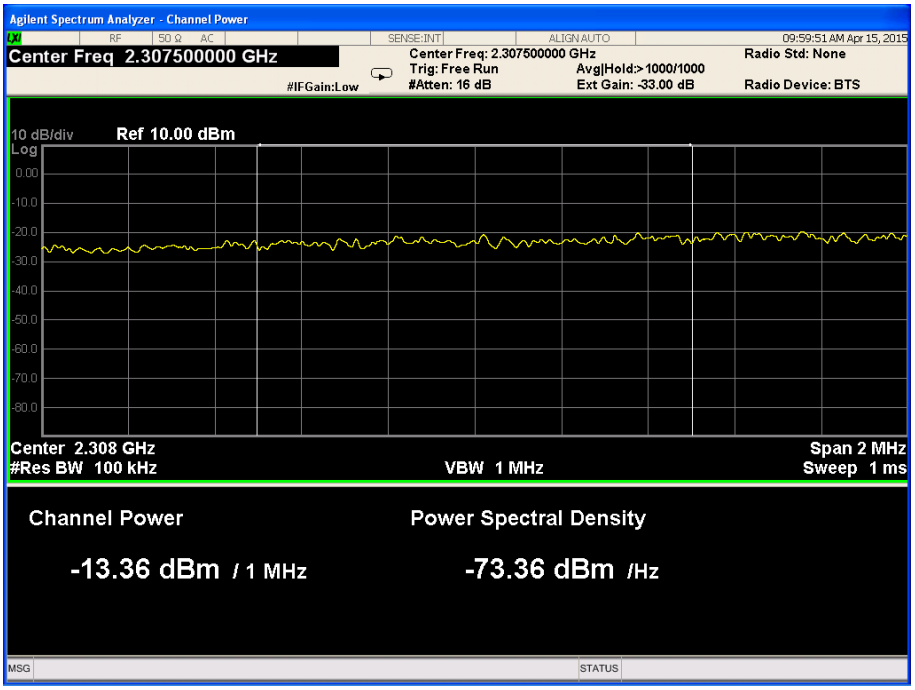


Figure 48. — 2307.0 MHz-2308.0 MHz

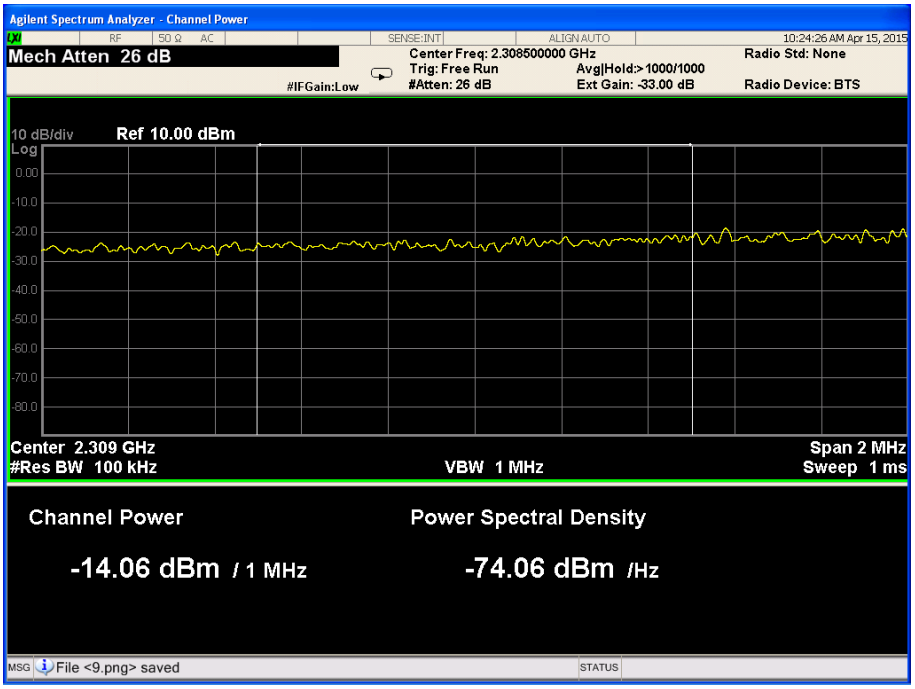


Figure 49. — 2308.0 MHz-2309.0 MHz

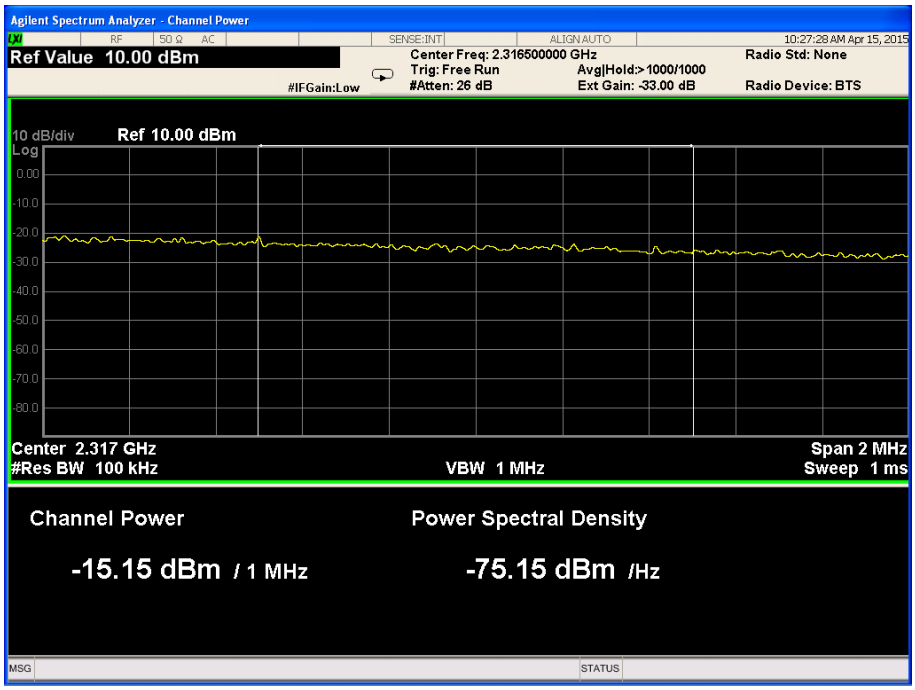


Figure 50. — 2316.0 MHz-2317.0 MHz

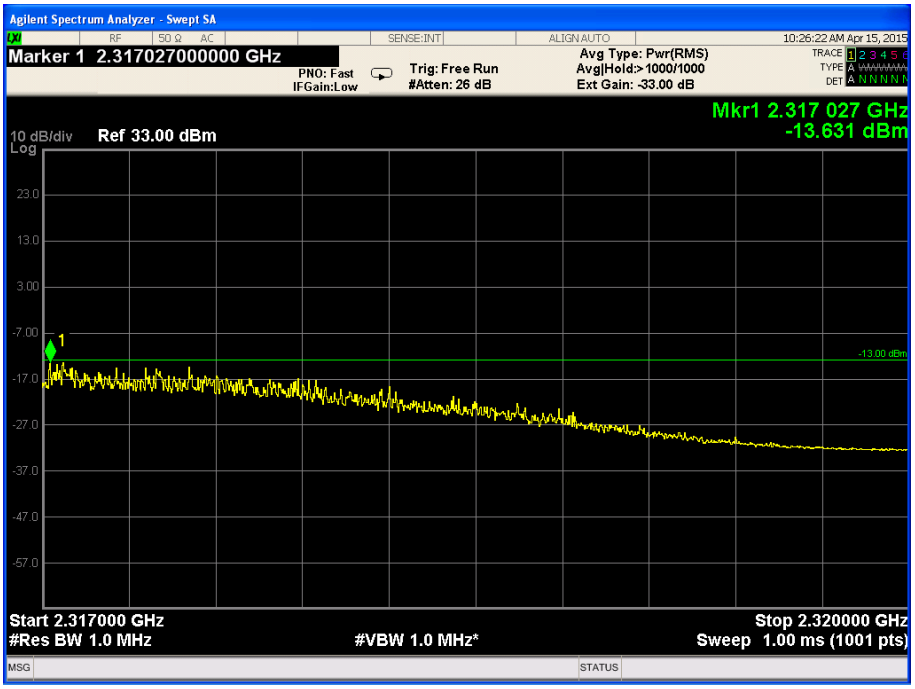


Figure 51. — 2317.0 MHz-2320.0 MHz

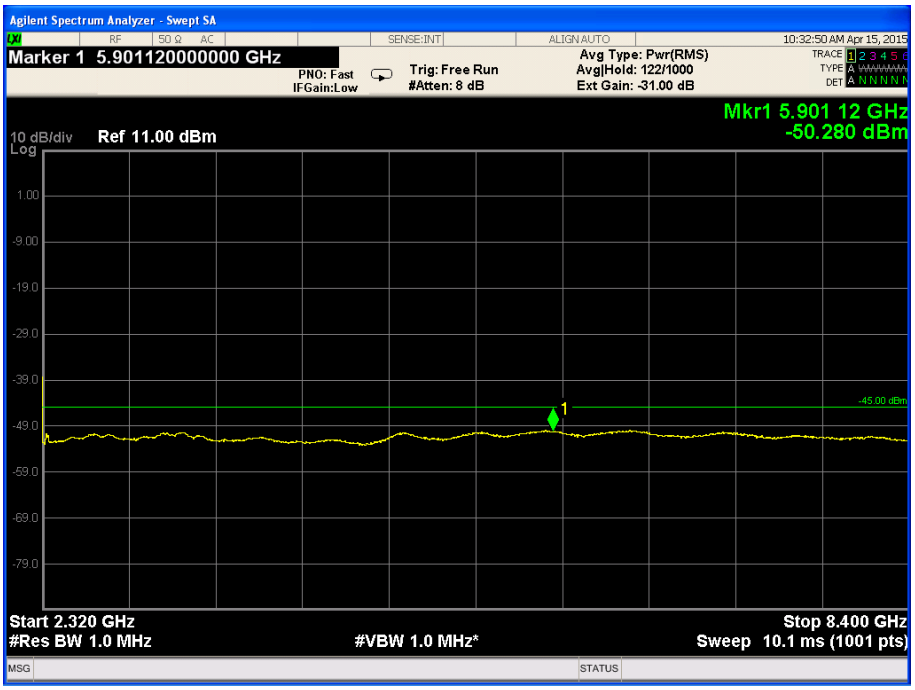


Figure 52. — 2320.0 MHz-8400.0 MHz

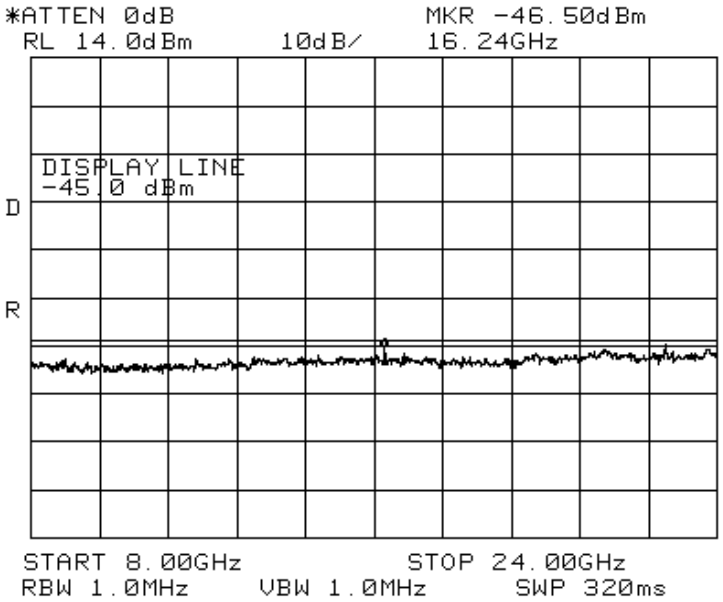


Figure 53. — 8000.0 MHz-24000.0 MHz

Frequency: 2307.5MHz
Bandwidth: 5MHz

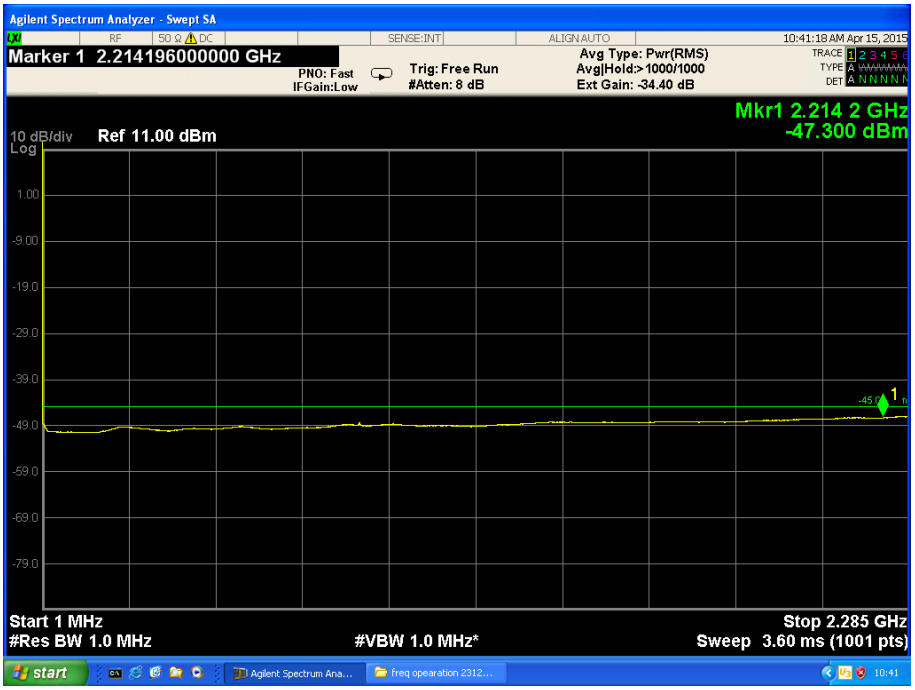


Figure 54. — 1.0 MHz-2285.0 MHz

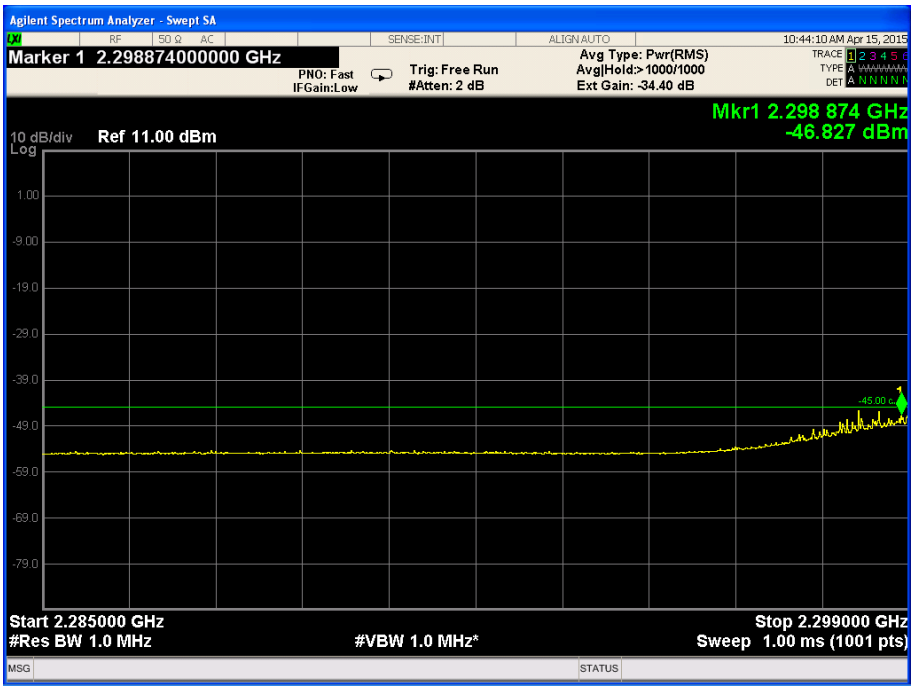


Figure 55. — 2285.0 MHz-2299.0 MHz

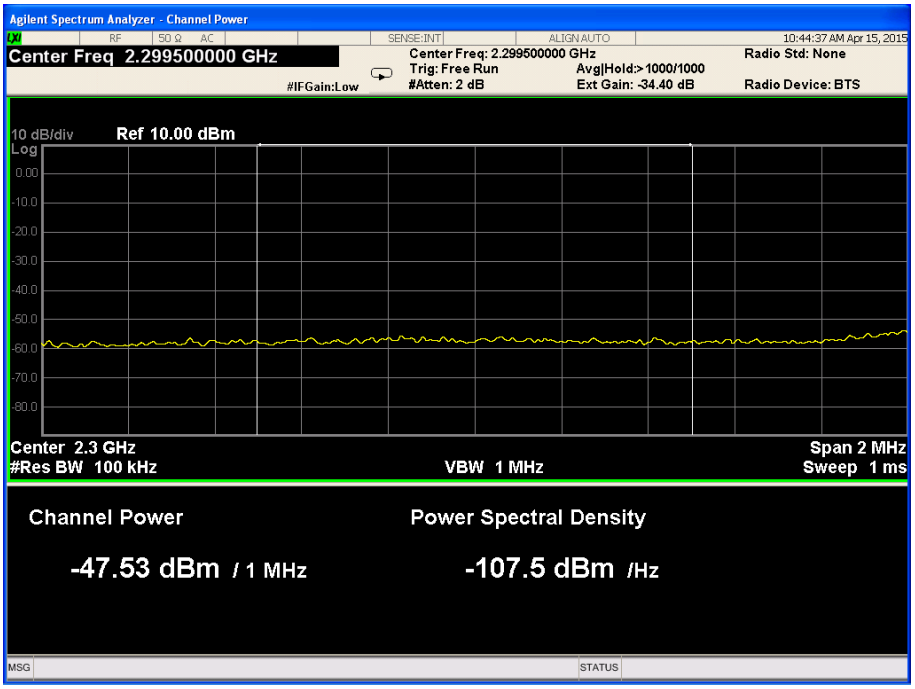


Figure 56. — 2299.0 MHz-2300.0 MHz

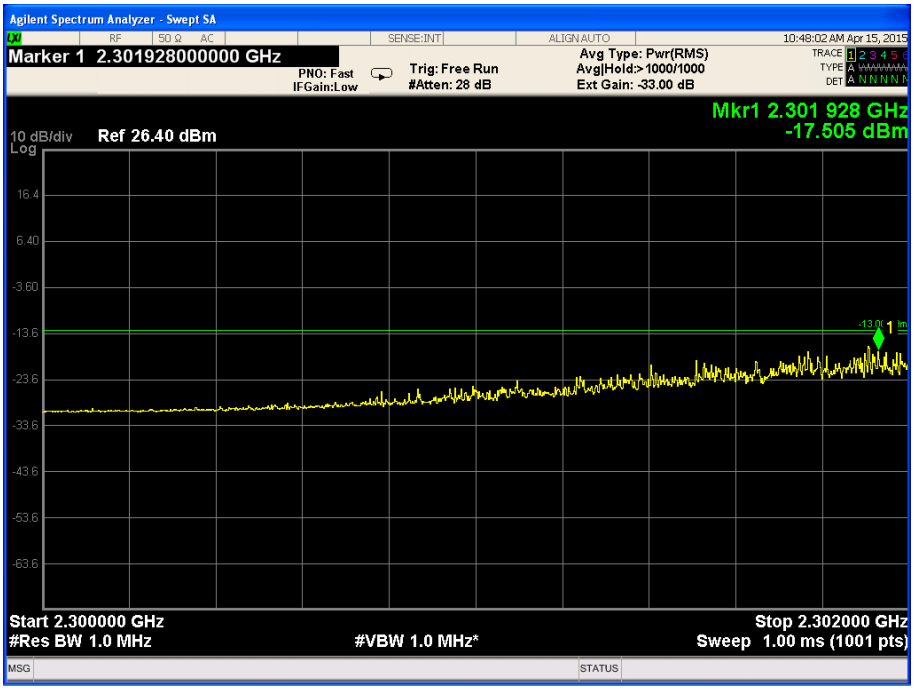


Figure 57. — 2300.0 MHz-2302.0 MHz

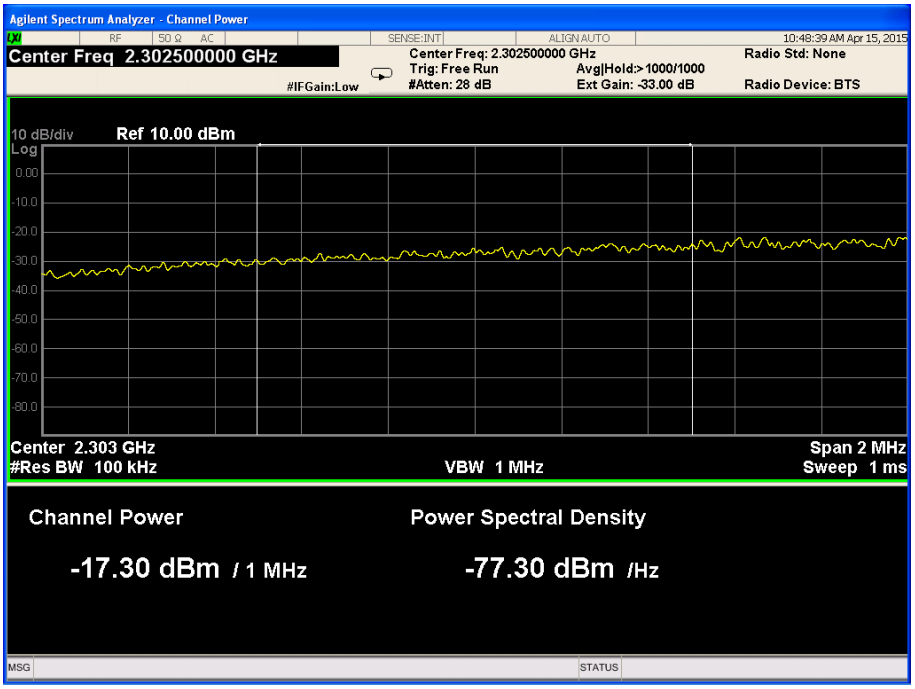


Figure 58. — 2302.0 MHz-2303.0 MHz

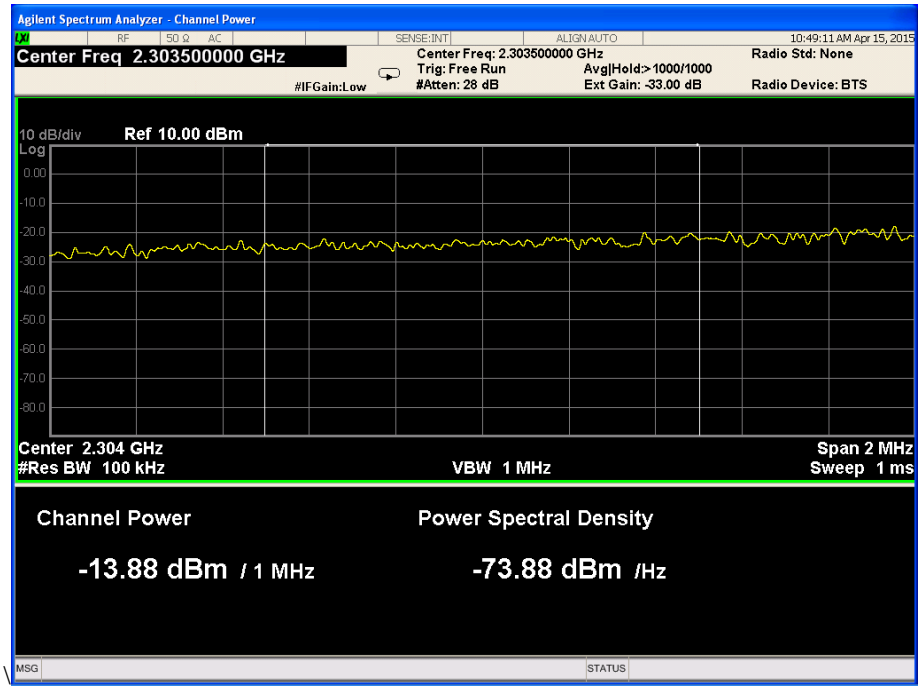


Figure 59. — 2303.0 MHz-2304.0 MHz

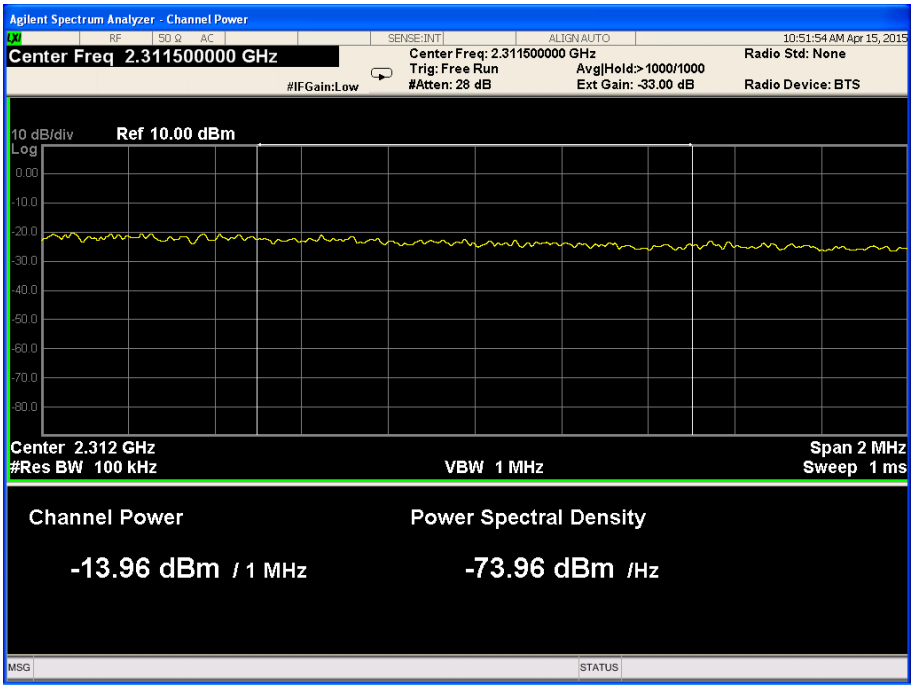


Figure 60. — 2311.0 MHz-2312.0 MHz

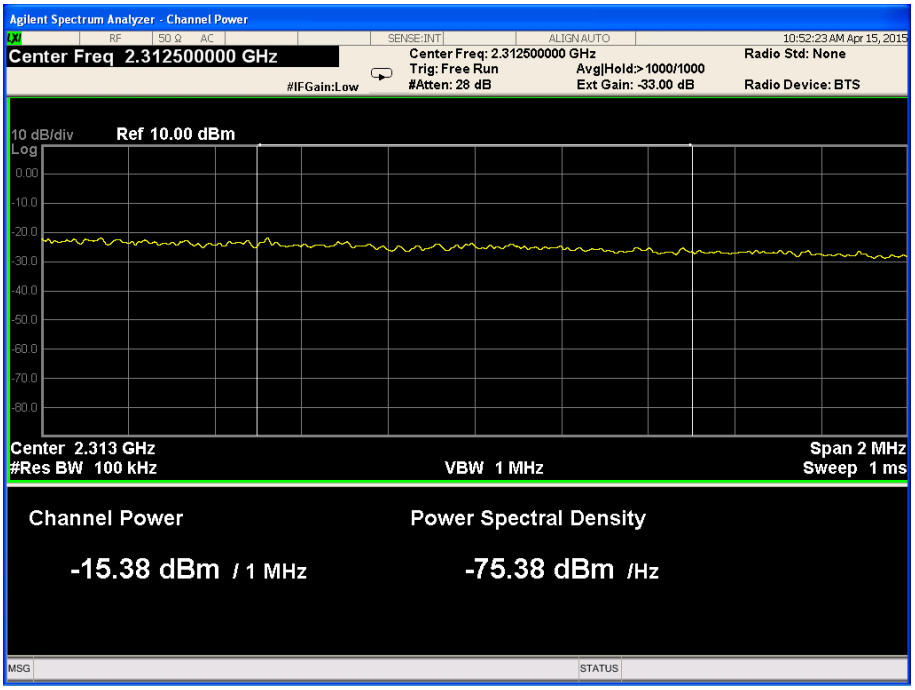


Figure 61. — 2312.0 MHz-2313.0 MHz

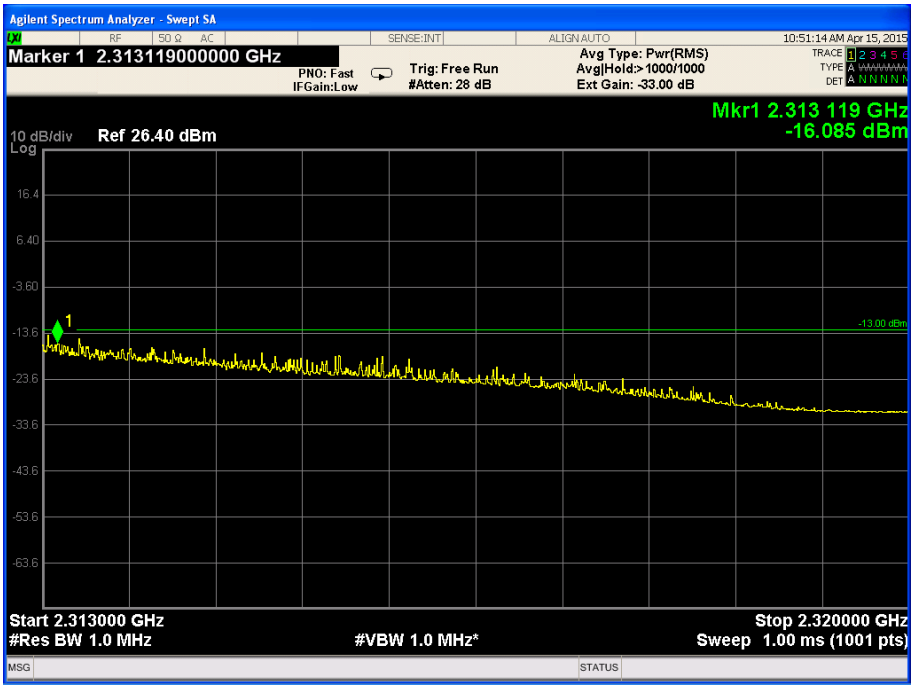


Figure 62. — 2313.0 MHz-2320.0 MHz

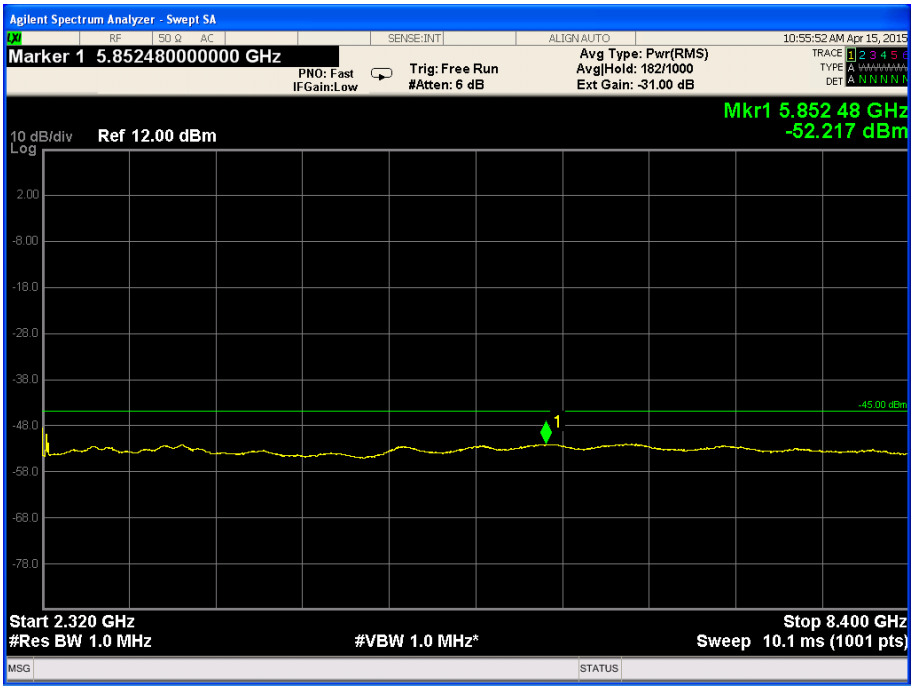


Figure 63. — 2320.0 MHz-8400.0 MHz

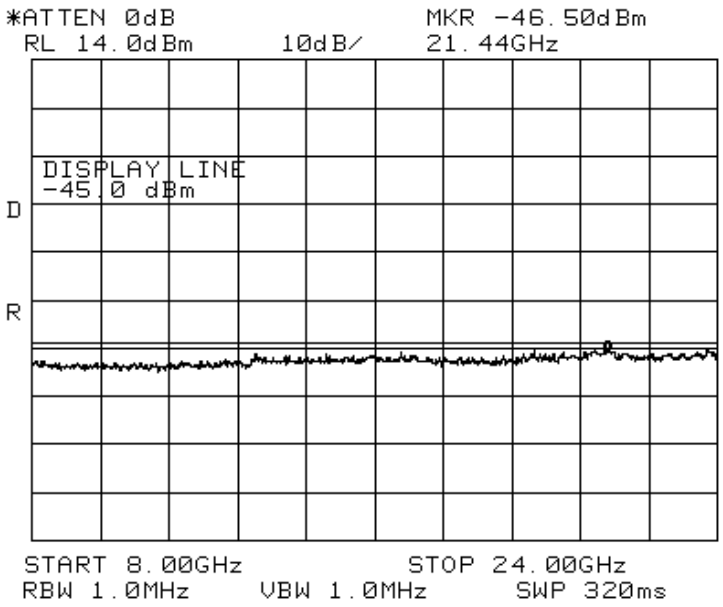


Figure 64. — 8000.0 MHz-24000.0 MHz

Frequency: 2310.MHz
Bandwidth: 10MHz

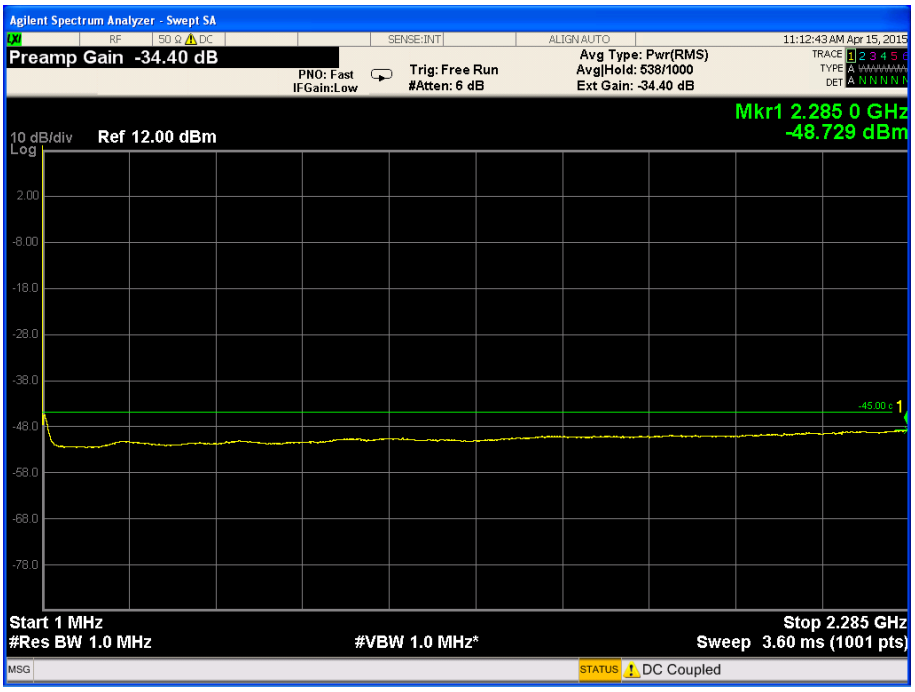


Figure 65. — 1.0 MHz-2285.0 MHz

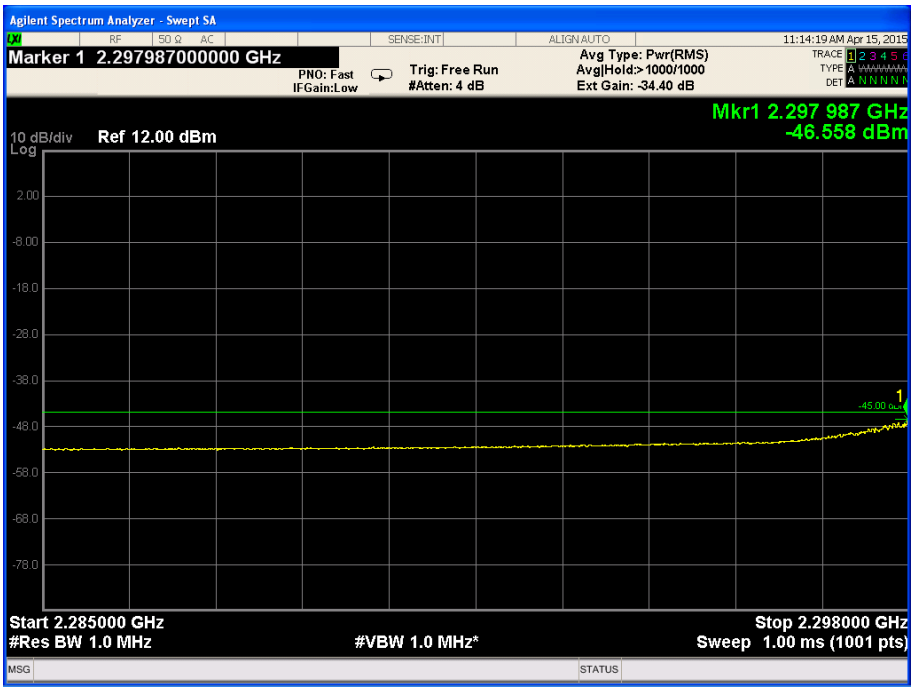


Figure 66. — 2285.0 MHz-2298.0 MHz

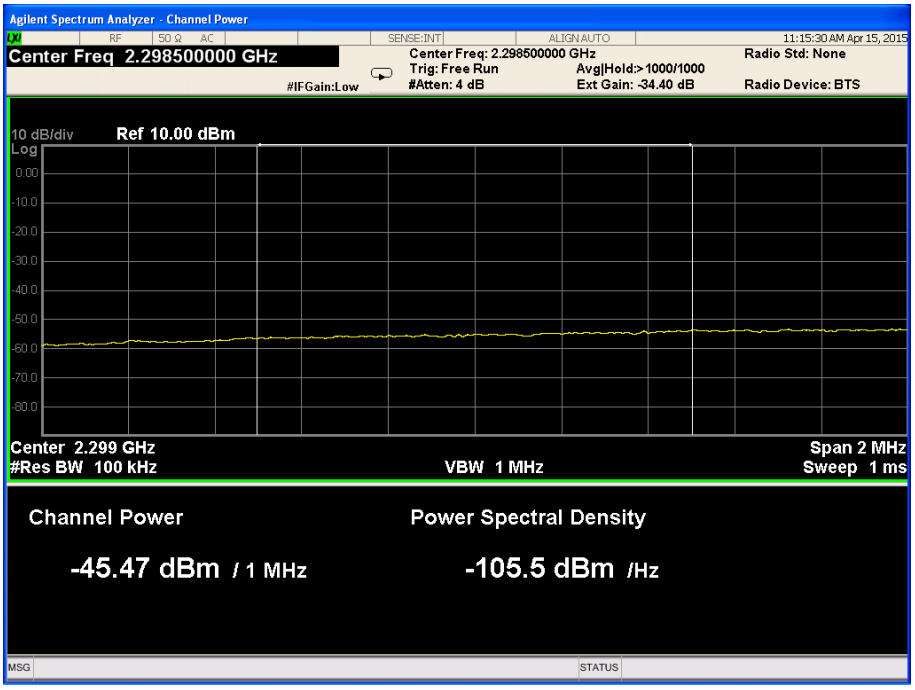


Figure 67. — 2298.0 MHz-2299.0 MHz

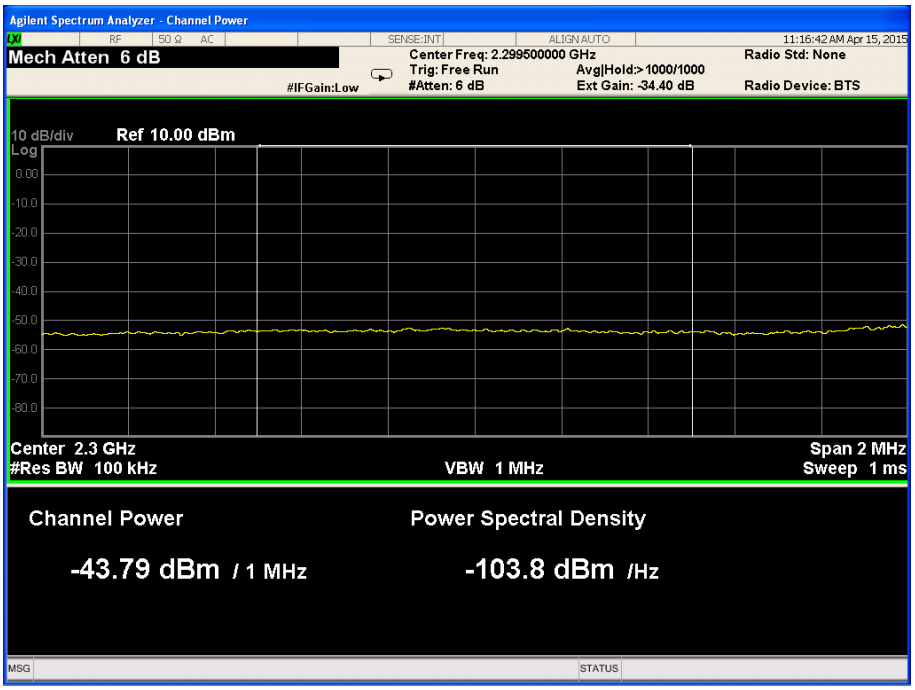


Figure 68. — 2299.0 MHz-2300.0 MHz

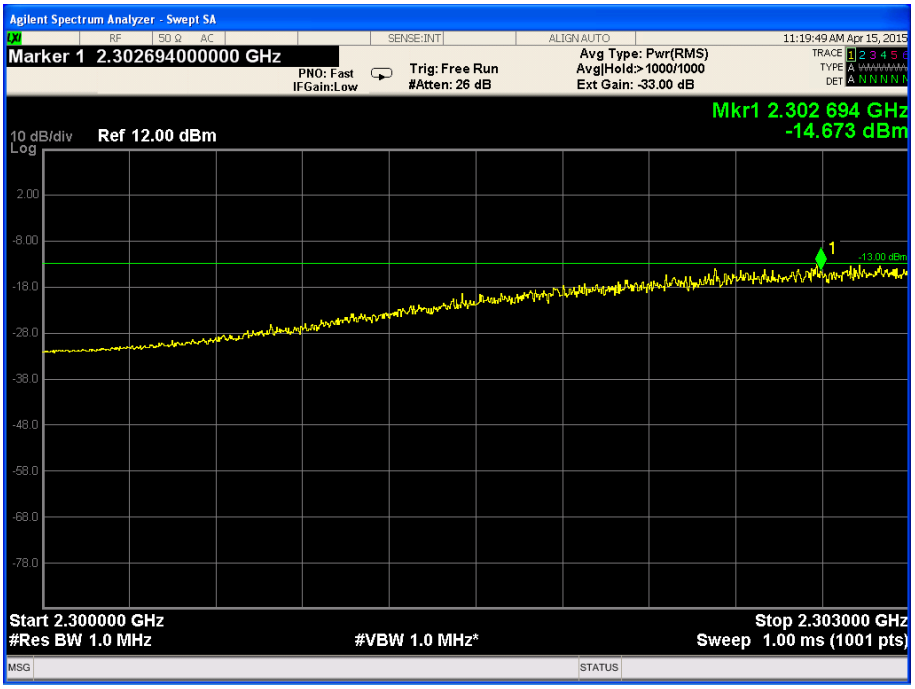


Figure 69. — 2300.0 MHz-2303.0 MHz

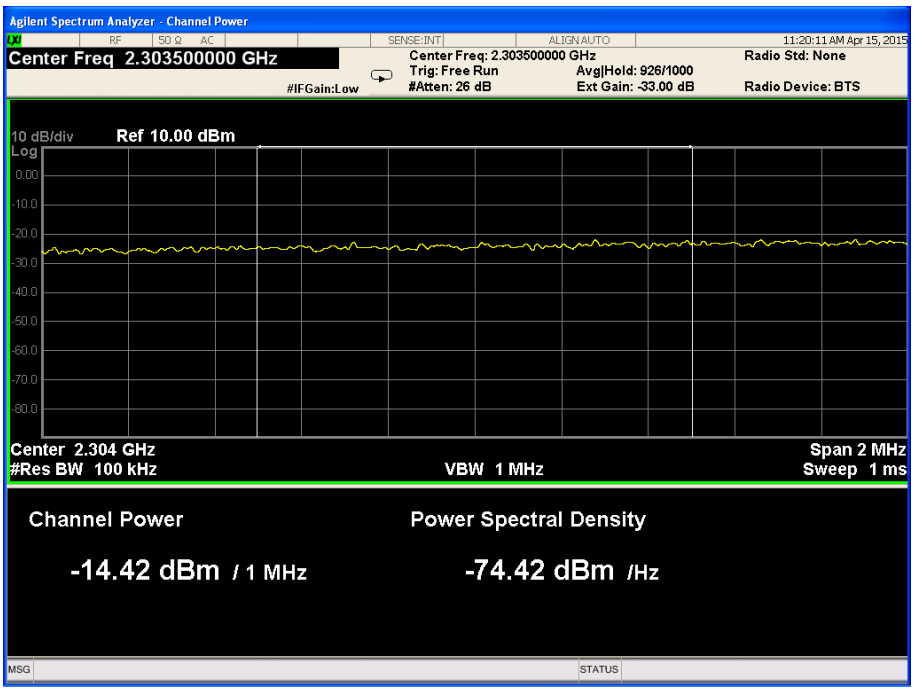


Figure 70. — 2303.0 MHz-2304.0 MHz

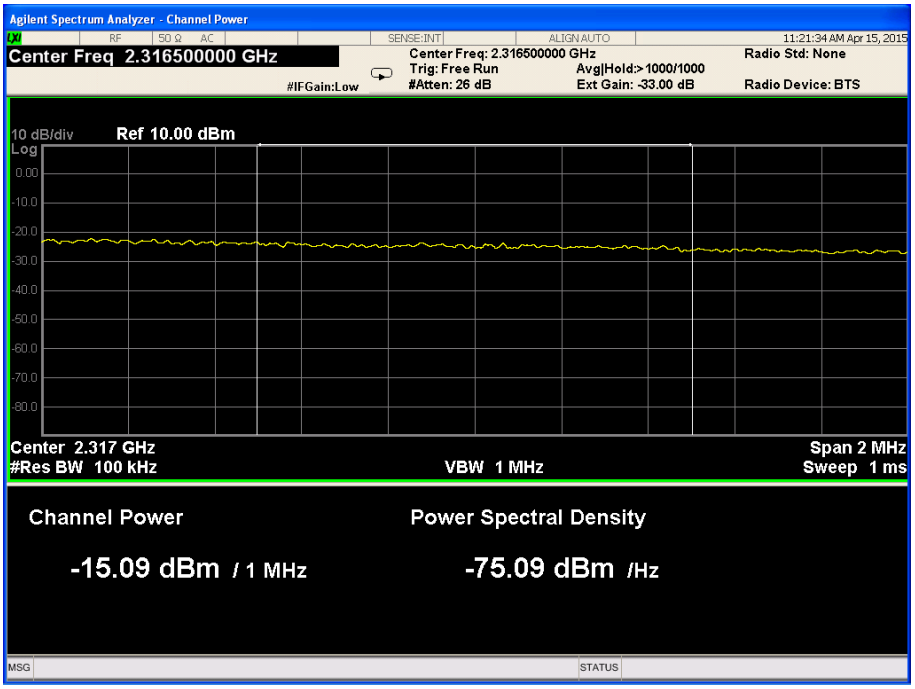


Figure 71. — 2316.0 MHz-2317.0 MHz

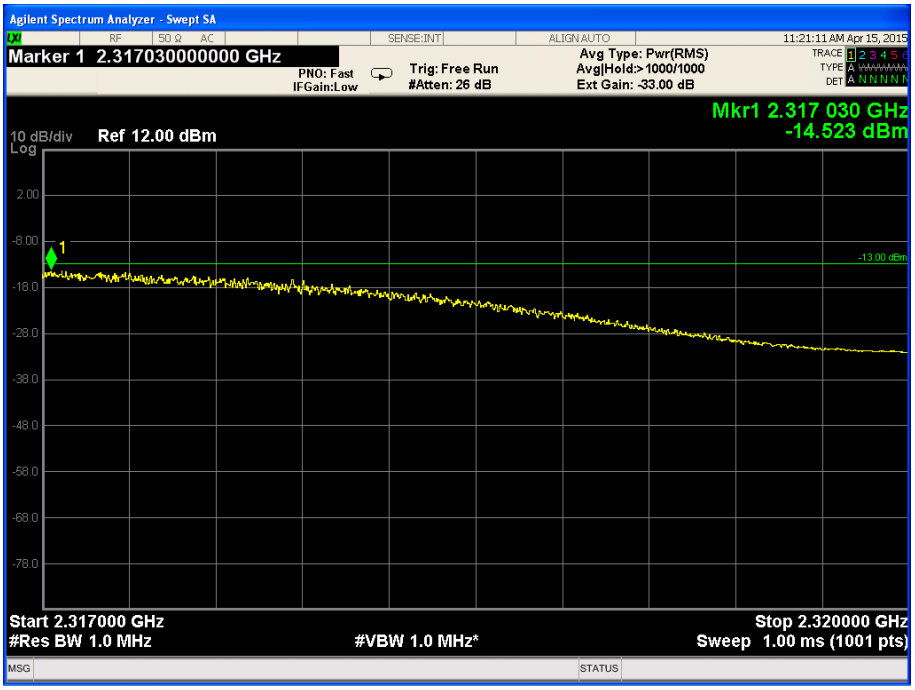


Figure 72. — 2317.0 MHz-2320.0 MHz

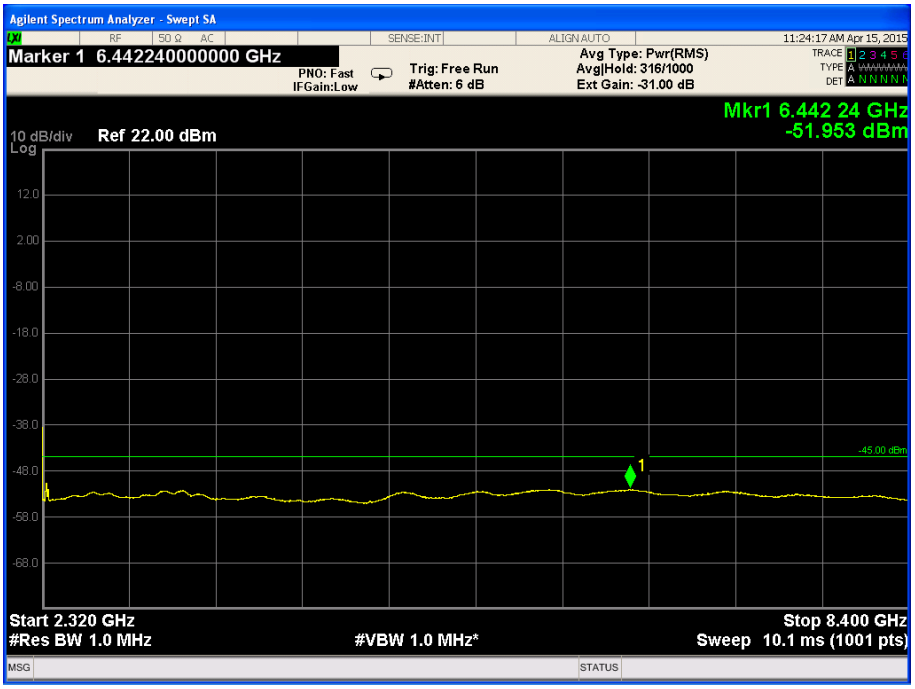


Figure 73. — 2320.0 MHz-8400.0 MHz

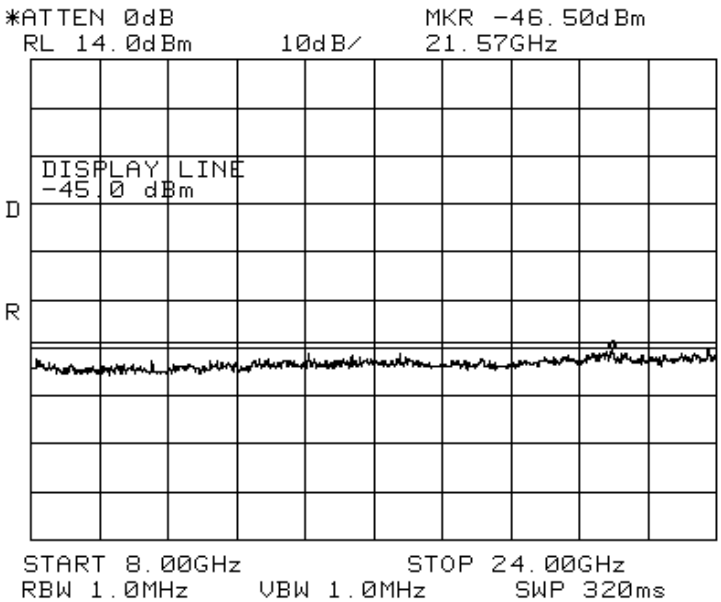


Figure 74. — 8000.0 MHz-24000.0 MHz

Frequency: 2355.0MHz
BW: 10MHz

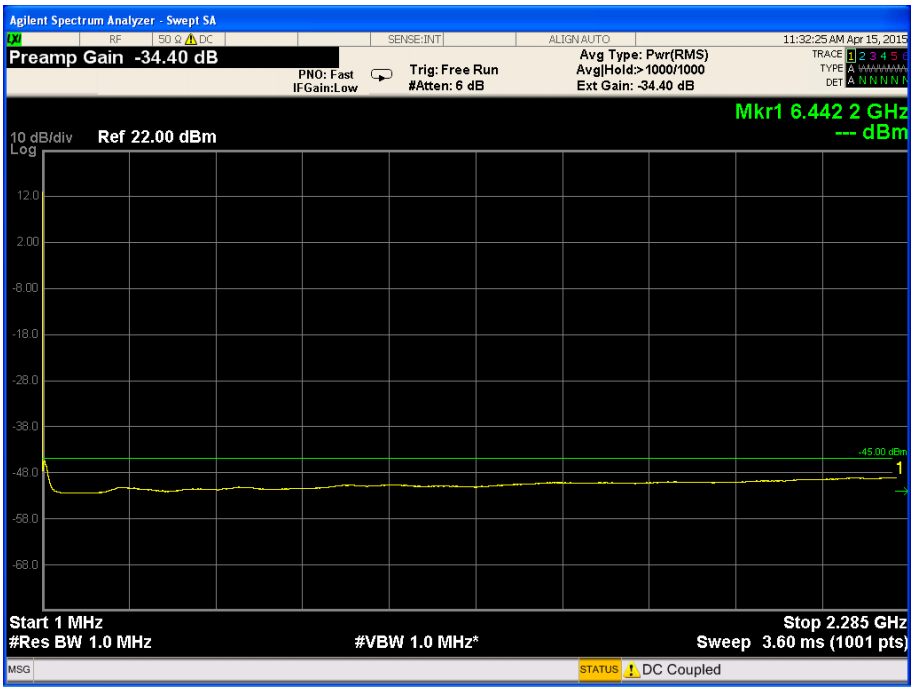


Figure 75. — 1.0 MHz-2285.0 MHz

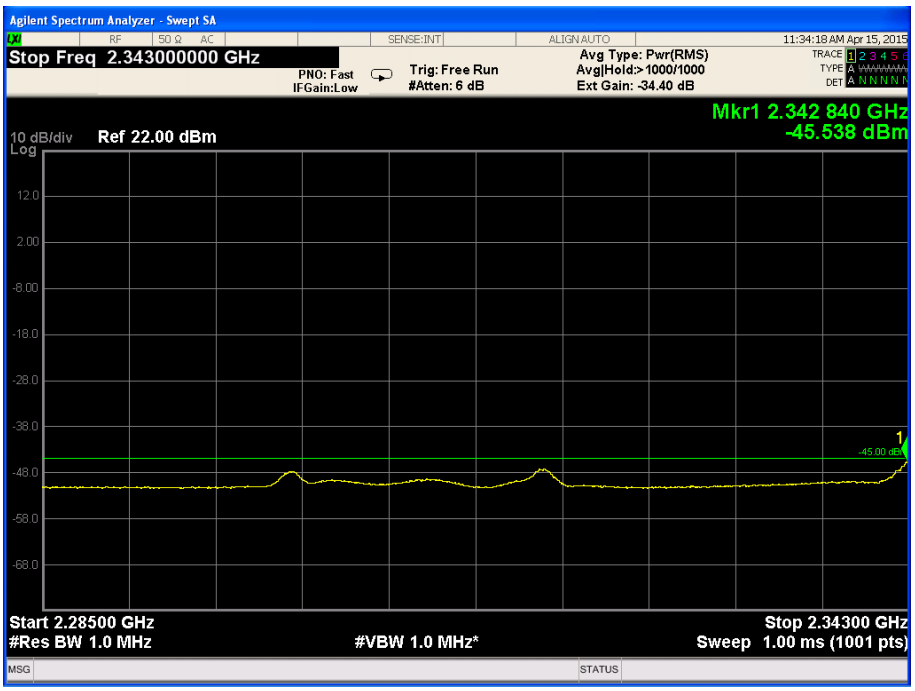


Figure 76. — 2285.0 MHz-2343.0 MHz

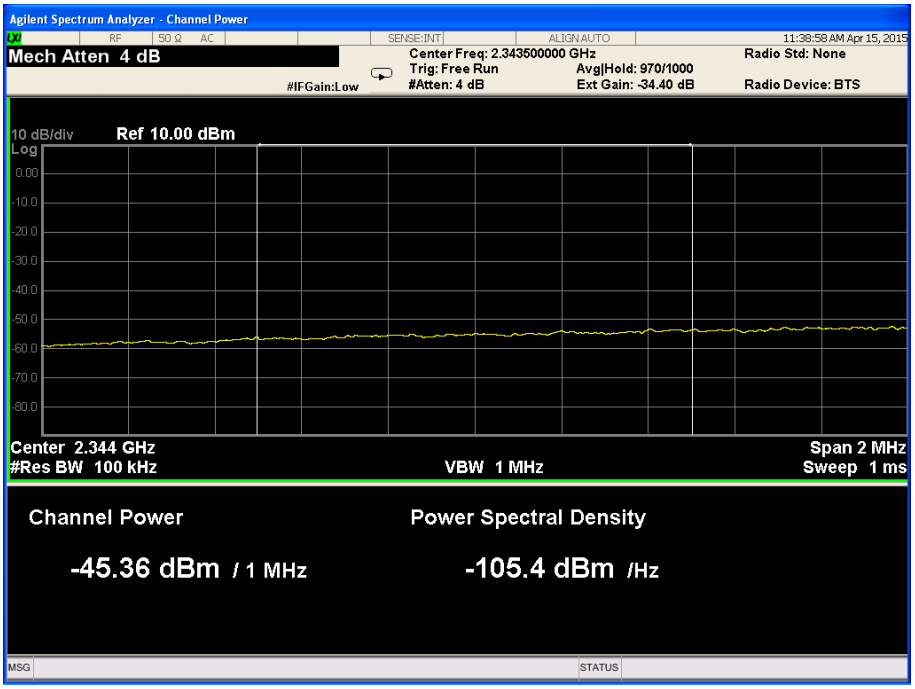


Figure 77. — 2343.0 MHz-2344.0 MHz

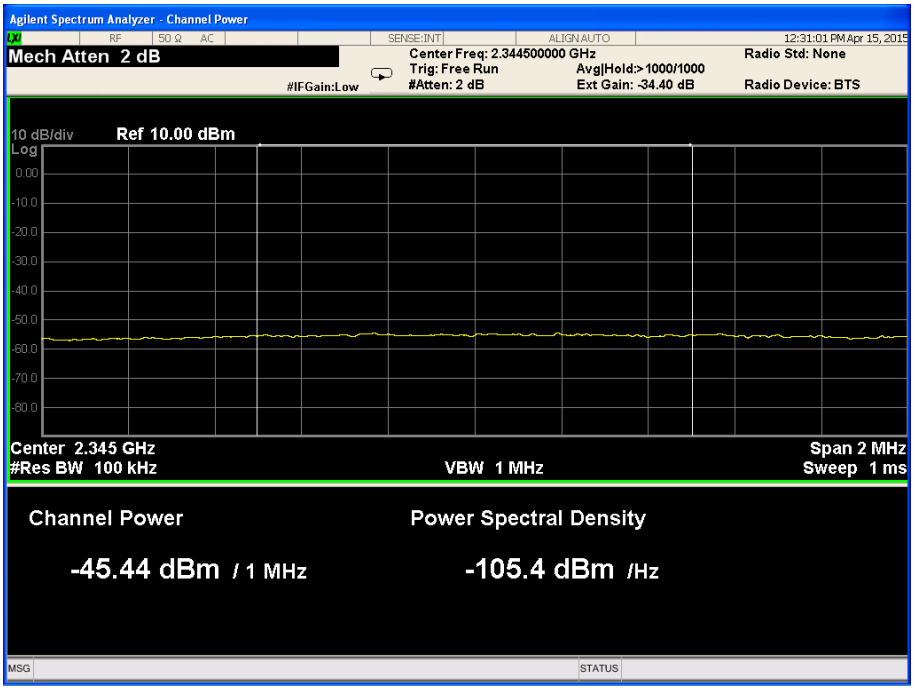


Figure 78. — 2344.0 MHz-2345.0 MHz

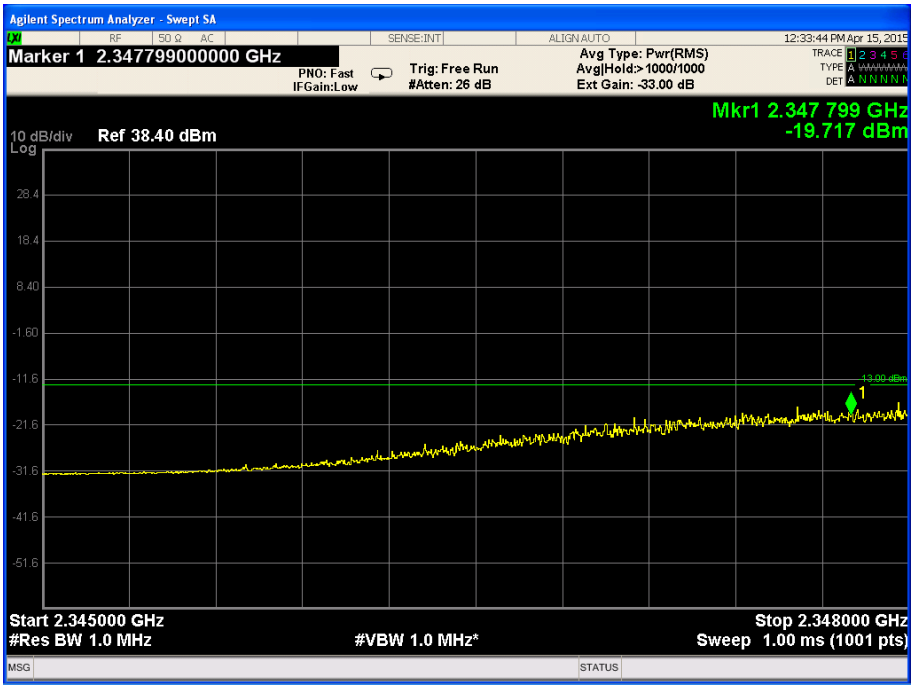


Figure 79. — 2345.0 MHz-2348.0 MHz

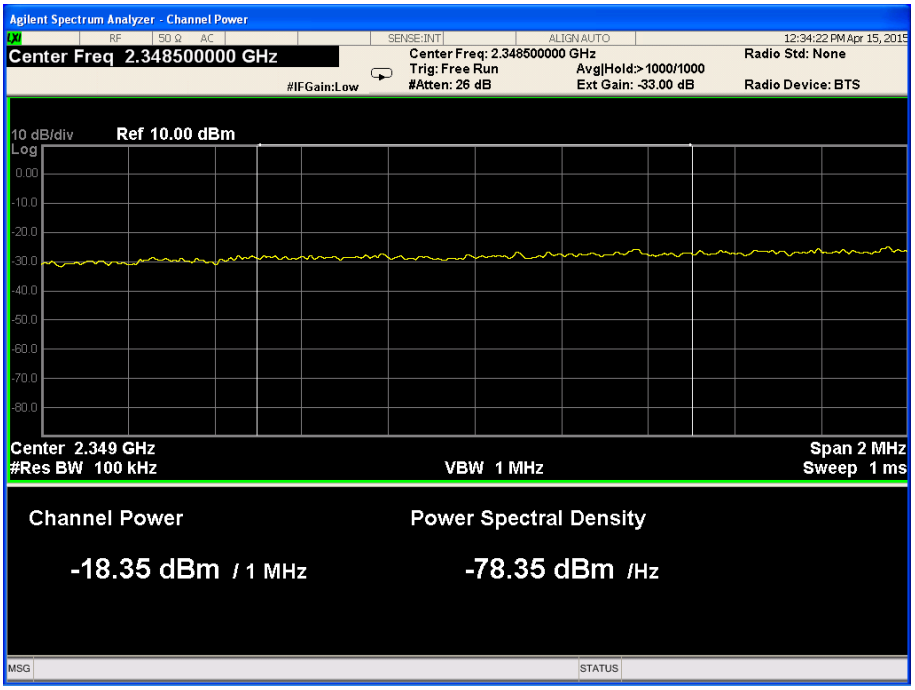


Figure 80. — 2348.0 MHz-2349.0 MHz

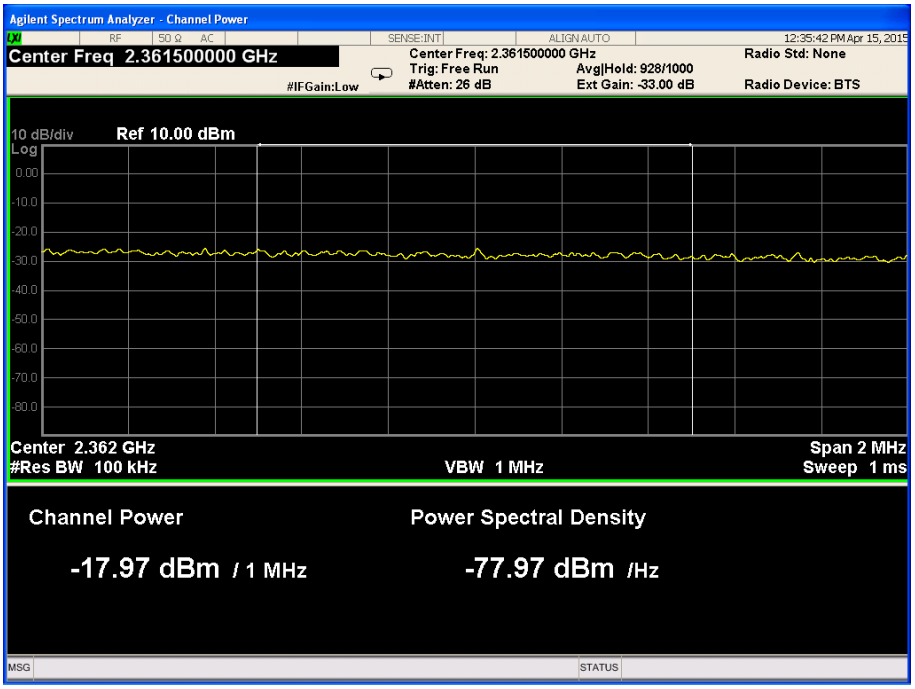


Figure 81. — 2361.0 MHz-2362.0 MHz

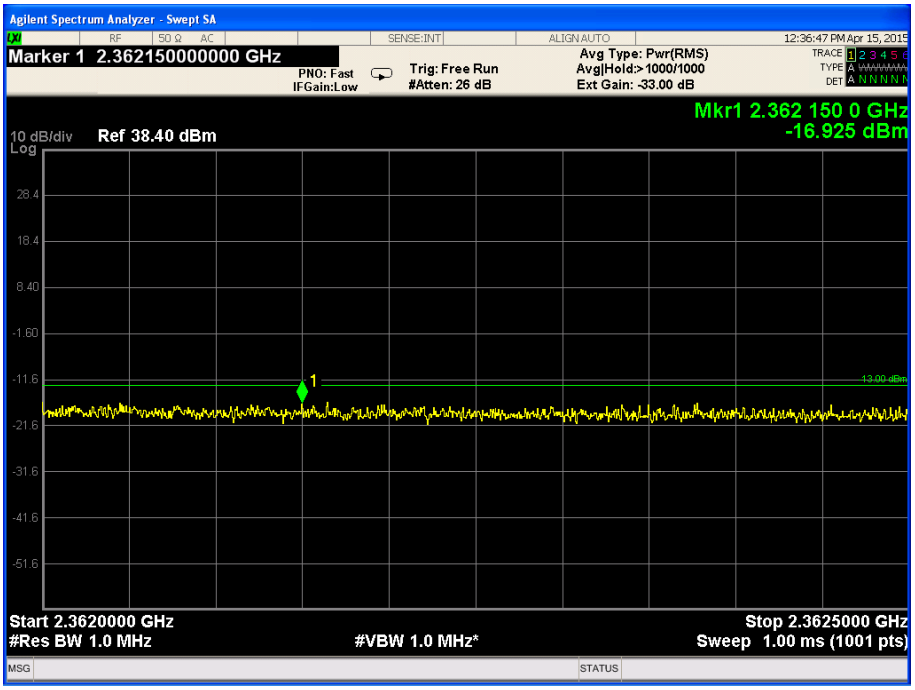


Figure 82. — 2362.0 MHz-2362.5 MHz

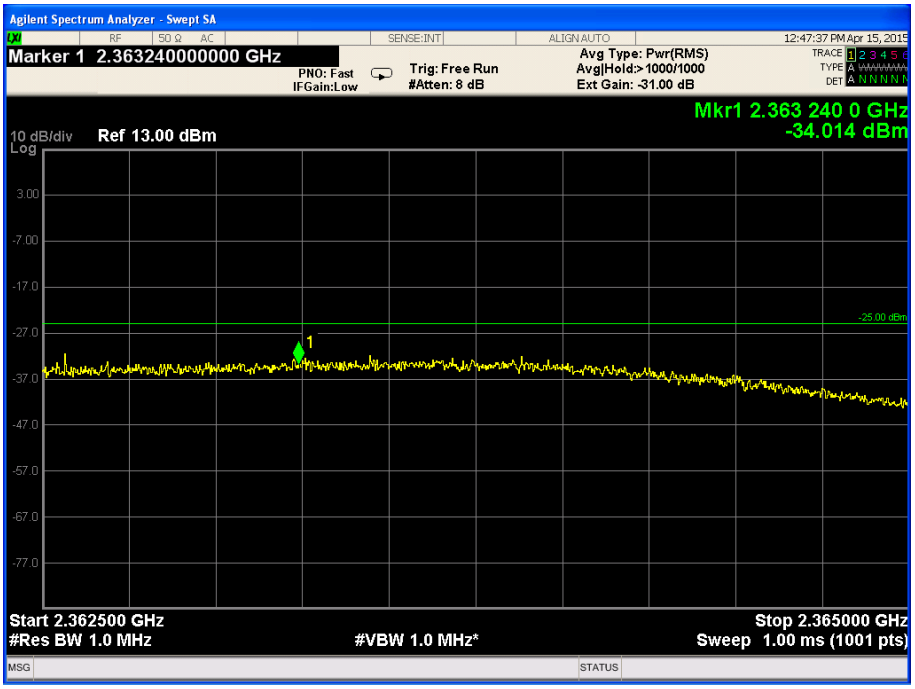


Figure 83. — 2362.5 MHz-2365.0 MHz

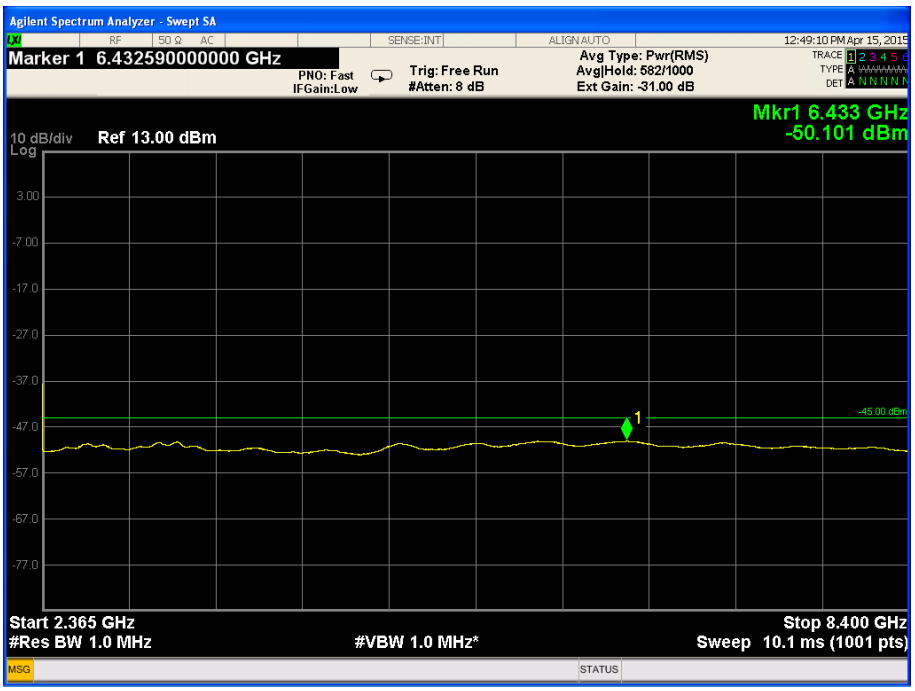


Figure 84. — 2365.0 MHz-8400.0 MHz

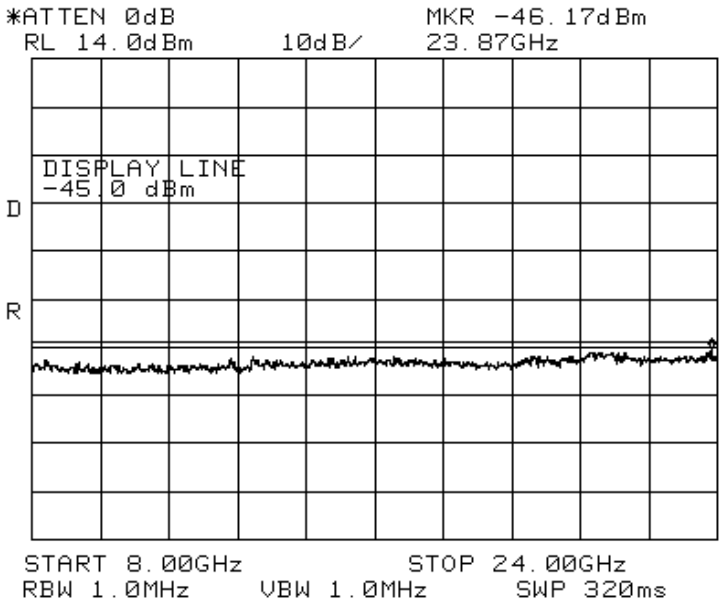


Figure 85. — 8000.0 MHz-24000.0 MHz

8.4 Test Equipment Used; Out of Band Emission at Antenna Terminals

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	R&S	ESIB7	100120	January 4, 2015	1 year
Spectrum Analyzer	R&S	FSL6	100194	January 1, 2015	1 year
Spectrum Analyzer	HP	8592L	3826A01204	March 4, 2015	1 year
Active Loop Antenna	EMCO	6502	2950	November 4, 2014	1 year
Biconical Log Antenna	EMCO	3142B	1078	May 22, 2014	2 years
Horn Antenna	ETS	3115	6142	March 14, 2012	3 years*
Horn Antenna	A.R.A	SWH-28	1007	March 30, 2014	2 years
D.C Block	JFW	50DB-007	1-23	N/A	N/A
Coupler	PULSAR	CS 10-05-436	10	N/A	N/A
Notch Filter	TELRAD	RMC2310_2355 D10M08	10050150	N/A	N/A
MXA Signal Analyzer	Agilent	N9020A	MY46471581	February 12 2015	2 years
Spectrum Analyzer	HP	8563E	3810A8846	November 30, 2014	1 year
10 dB Attenuator	Weinschel	33-10-34	BZ5739	N/A	N/A
5 dB Attenuator	Mini-circuits	VAT-5+	15542	N/A	N/A
Power Splitter	Mini-circuits	ZN2PD-63-S+	F442300839	N/A	N/A
Attenuator	Weinschel	24-20-34	BZ144	N/A	N/A
Attenuator	Weinschel	24-20-34	BY0842	N/A	N/A
Attenuator	Weinschel	24-20-34	BY0855	N/A	N/A
Attenuator	Weinschel	24-20-34	BY0842	N/A	N/A
Signal Generator	WILTRON	6747B	278007	October 23, 2014	1 year

Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	August 29, 2014	1 year
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	August 22, 2014	1 year
Environmental Chamber	THERMOTRON CORP	SM 32C Mini Max	25-1030	February 24, 2015	1 year
Antenna Mast	ETS	2070-2	-	N/A	N/A
Turntable	ETS	2087	-	N/A	N/A
Mast & Table Controller	ETS/EMCO	2090	9608-1456	N/A	N/A

*Note – Extended to May 19, 2015

Figure 86 Test Equipment Used

9. Band Edge Spectrum

9.1 Test Specification

FCC Part 27, Section 53(a)(1)

9.2 Test Procedure

The power of any emission in the 1 MHz bands immediately outside and adjacent to the channel blocks (2305M-2320MHz, 2350M-2365MHz) must be attenuated below the transmitting power (P) by a factor as specified in this section (-13dBm).
The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator and an appropriate coaxial cable (-33.0dB).
The spectrum analyzer RBW was set to 1% from OBW.
The evaluation was repeated for all modulations.

9.3 Test Results

Modulation	BW	Operation Frequency (MHz)	Band Edge LOW (MHz)	Reading LOW (dBm)	Band Edge HIGH (MHz)	Reading HIGH (dBm)	Specification (dBm)	Margin LOW (dB)	Margin HIGH (dB)
64QAM	5M	2307.5	2305.0	-19.3	2310.0	-17.1	-13.0	-6.3	-4.1
	5M	2312.5	2310.0	-20.4	2315.0	-16.7	-13.0	-7.4	-3.7
	10M	2310.0	2305.0	-18.3	2315.0	-17.8	-13.0	-5.3	-4.8
16QAM	5M	2307.5	2305.0	-19.6	2310.0	-17.6	-13.0	-6.6	-4.6
	5M	2312.5	2310.0	-18.9	2315.0	-16.6	-13.0	-5.6	-3.6
	10M	2310.0	2305.0	-17.9	2315.0	-18.5	-13.0	-4.9	-5.5
QPSK	5M	2307.5	2305.0	-19.1	2310.0	-17.2	-13.0	-6.1	-4.2
	5M	2312.5	2310.0	-16.2	2315.0	-18.3	-13.0	-3.2	-5.3
	10M	2310.0	2305.0	-16.7	2315.0	-17.5	-13.0	-3.7	-4.5

Figure 87 Lower Sub-Band - Band Edge Spectrum Results

Modulation	BW	Operation Frequency (MHz)	Band Edge LOW (MHz)	Reading LOW (dBm)	Band Edge HIGH (MHz)	Reading HIGH (dBm)	Specification (dBm)	Margin LOW (dB)	Margin HIGH (dB)
64QAM	5M	2352.5	2350.0	-19.9	2355.0	-16.2	-13.0	-6.9	-3.2
	5M	2357.5	2355.0	-19.3	2360.0	-16.6	-13.0	-6.3	-3.6
	10M	2355.0	2350.0	-19.8	2360.0	-18.2	-13.0	-6.8	-5.2
16QAM	5M	2352.5	2350.0	-19.9	2355.0	-17.1	-13.0	-6.9	-4.1
	5M	2357.5	2355.0	-17.9	2360.0	-17.4	-13.0	-4.9	-4.4
	10M	2355.0	2350.0	-20.3	2360.0	-19.0	-13.0	-7.3	-6.0
QPSK	5M	2352.5	2350.0	-16.2	2355.0	-17.5	-13.0	-3.2	-4.5
	5M	2357.5	2355.0	-16.3	2360.0	-17.8	-13.0	-3.3	-4.8
	10M	2355.0	2350.0	-19.1	2360.0	-17.8	-13.0	-6.1	-4.8

Figure 88 Higher Sub-Band - Band Edge Spectrum Results

See additional information in *Figure 266* to *Figure 301*.

JUDGEMENT: Passed by 3.2 dB

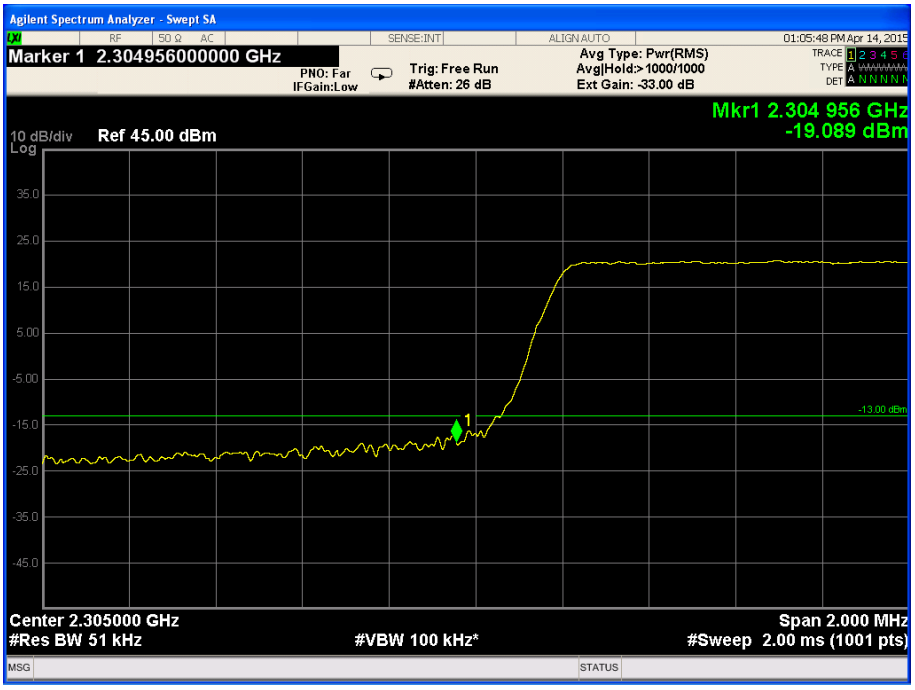


Figure 89. — QPSK - Operating Freq.: 2307.5MHz, BW: 5MHz, Low Band Edge

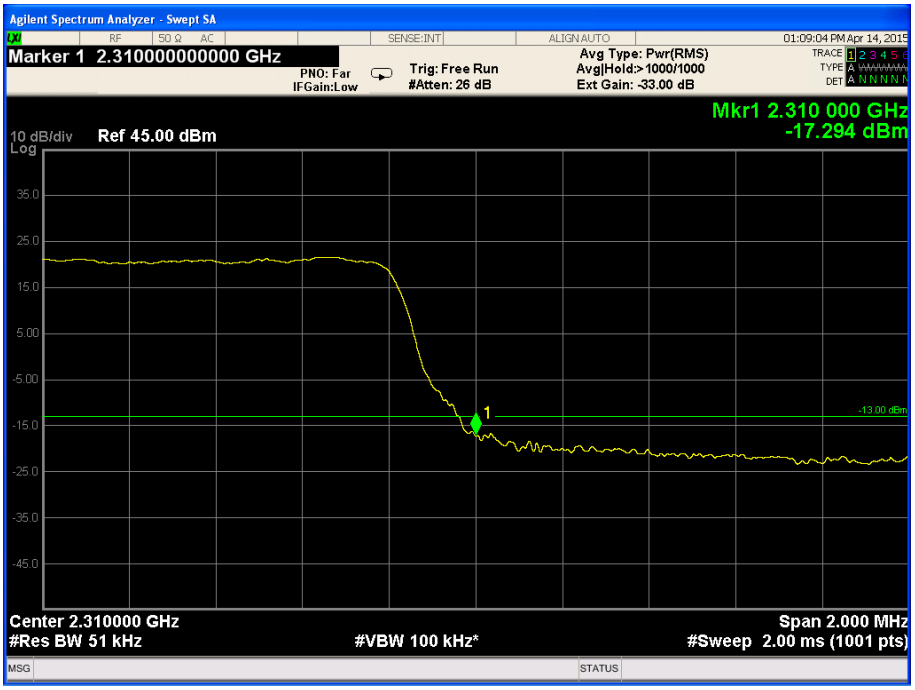


Figure 90. — QPSK - Operating Freq.: 2307.5MHz, BW: 5MHz, High Band Edge

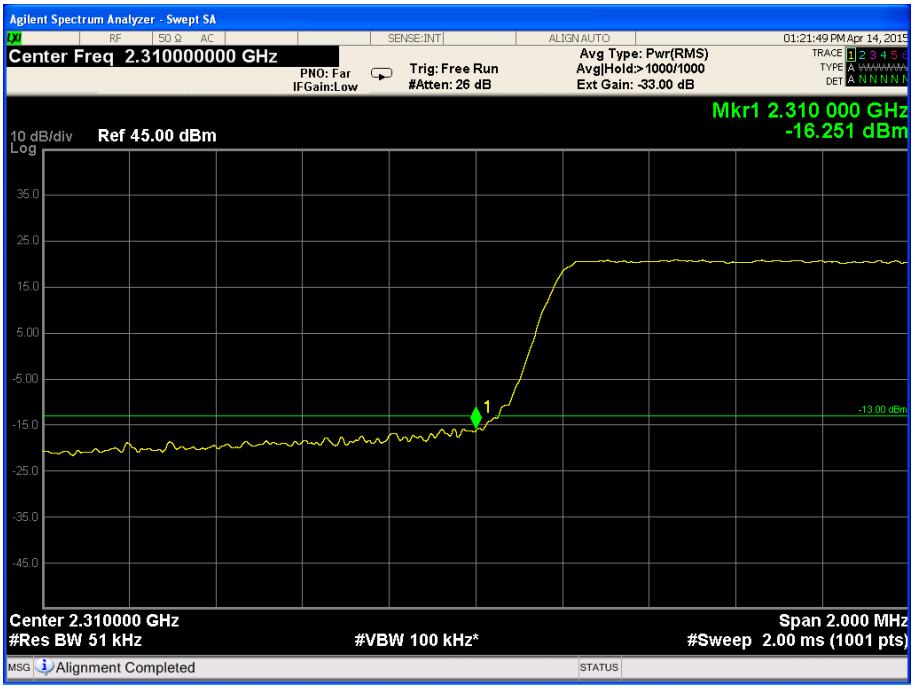


Figure 91. — QPSK - Operating Freq.: 2312.5MHz, BW: 5MHz, Low Band Edge

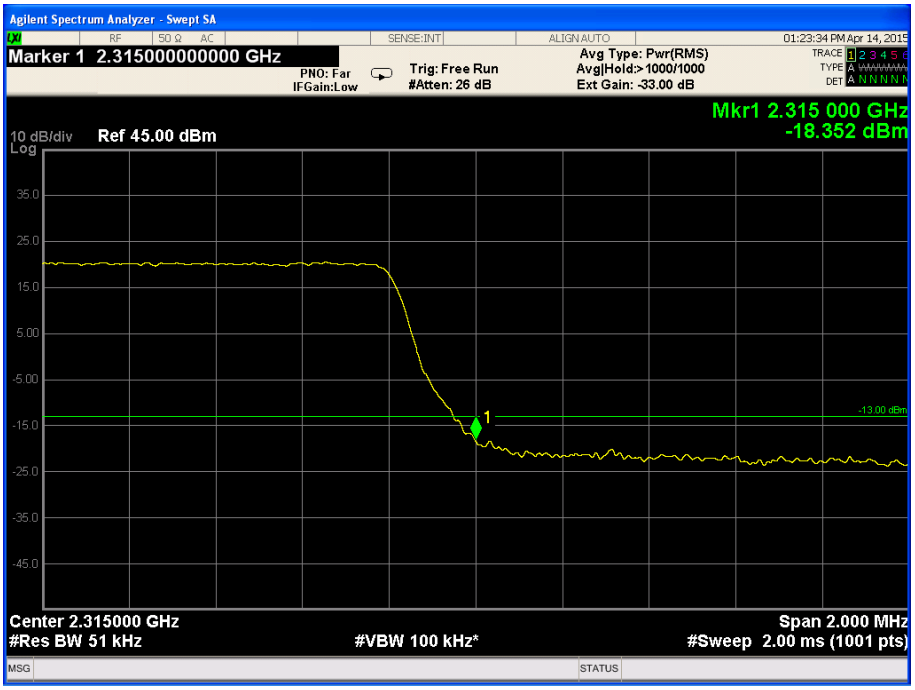


Figure 92. — QPSK - Operating Freq.: 2312.5MHz, BW: 5MHz, High Band Edge

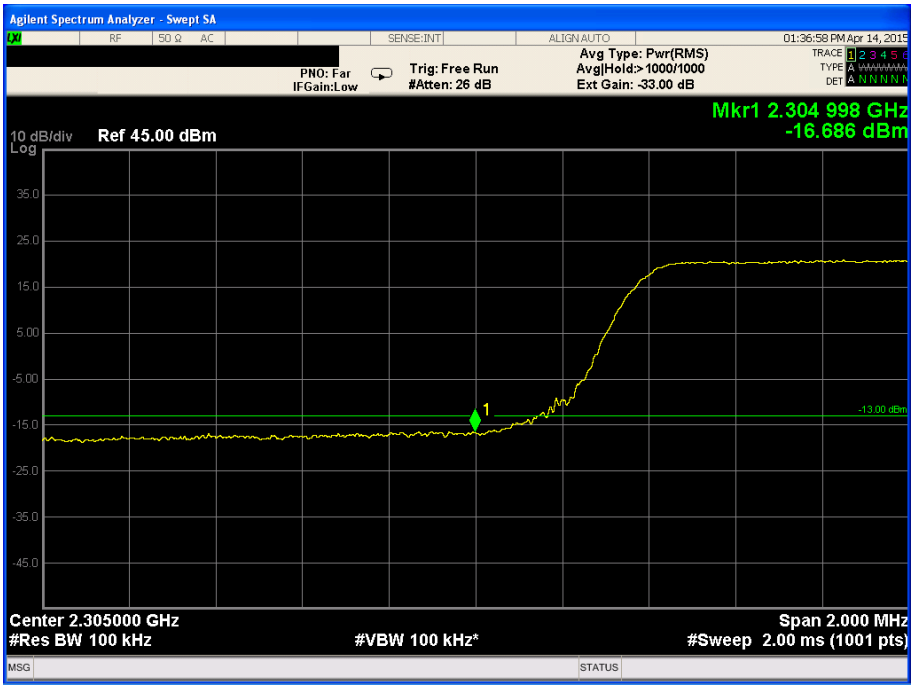


Figure 93. — QPSK - Operating Freq.: 2310.0MHz, BW: 10MHz, Low Band Edge

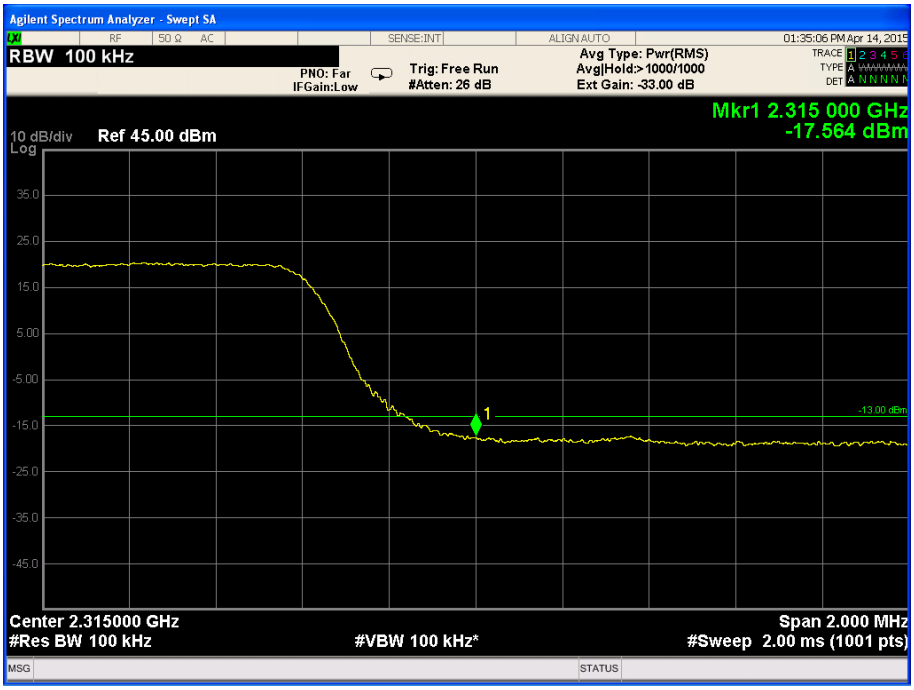


Figure 94. — QPSK - Operating Freq.: 2310.5MHz, BW: 10MHz, High Band Edge

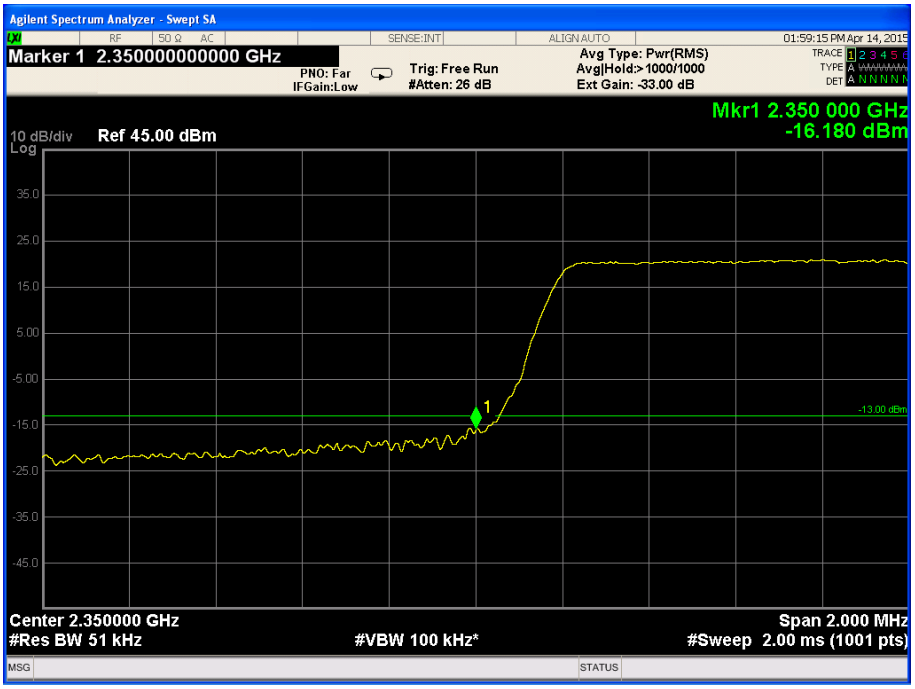


Figure 95. — QPSK - Operating Freq.: 2352.5.5MHz, BW: 5MHz, Low Band Edge

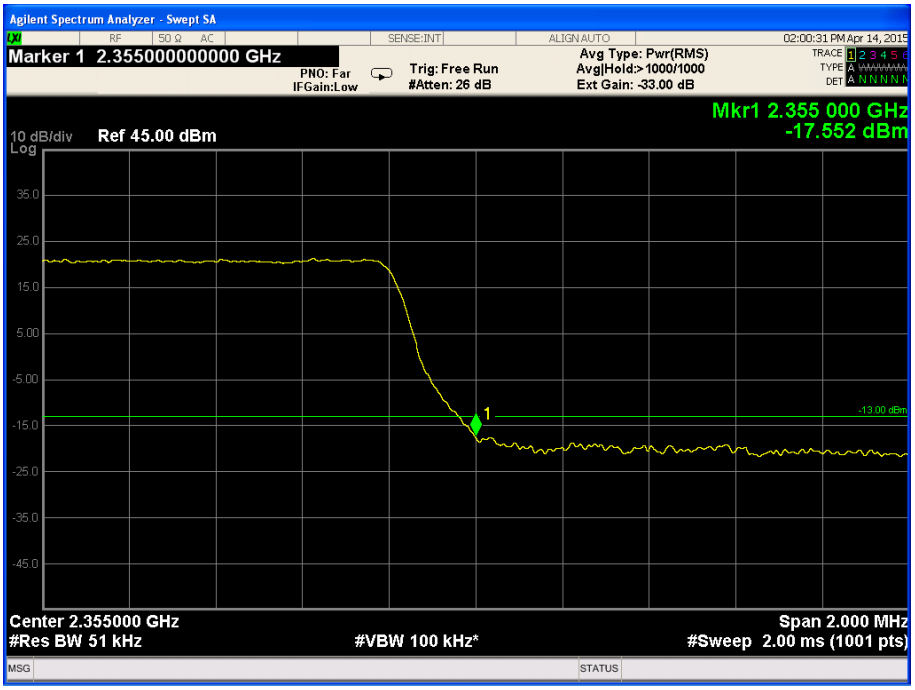


Figure 96. — QPSK - Operating Freq.: 2352.5MHz, BW: 5MHz, High Band Edge

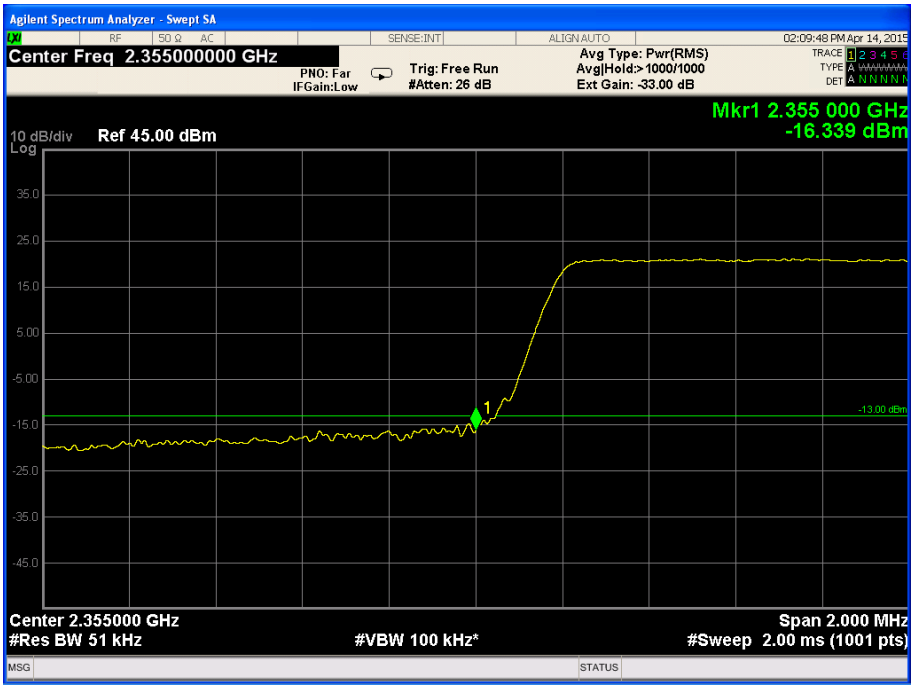


Figure 97. — QPSK - Operating Freq.: 2357.5MHz, BW: 5MHz, Low Band Edge

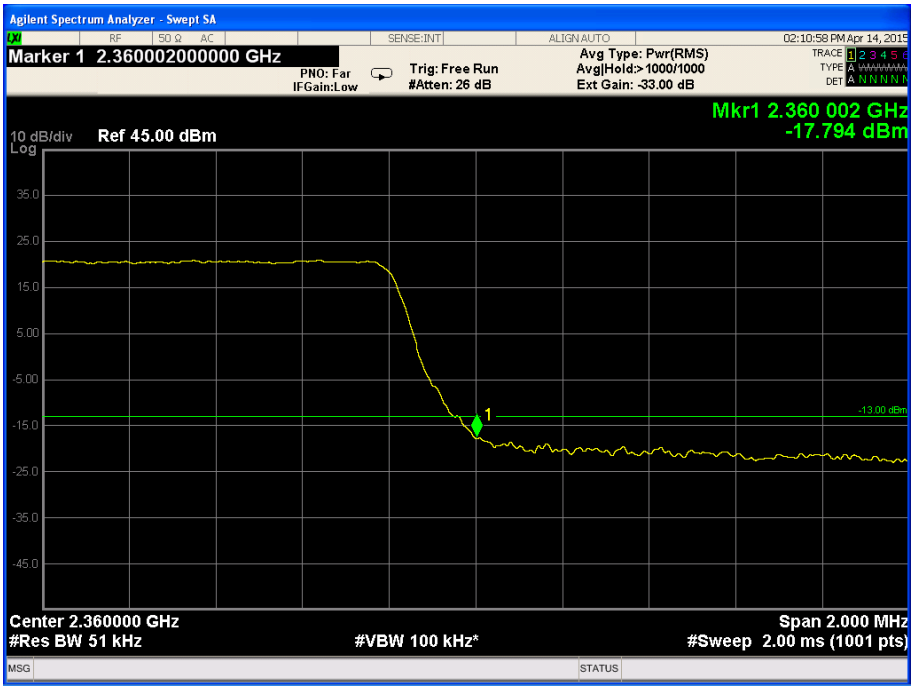


Figure 98. — QPSK - Operating Freq.: 2357.5MHz, BW: 5MHz, High Band Edge

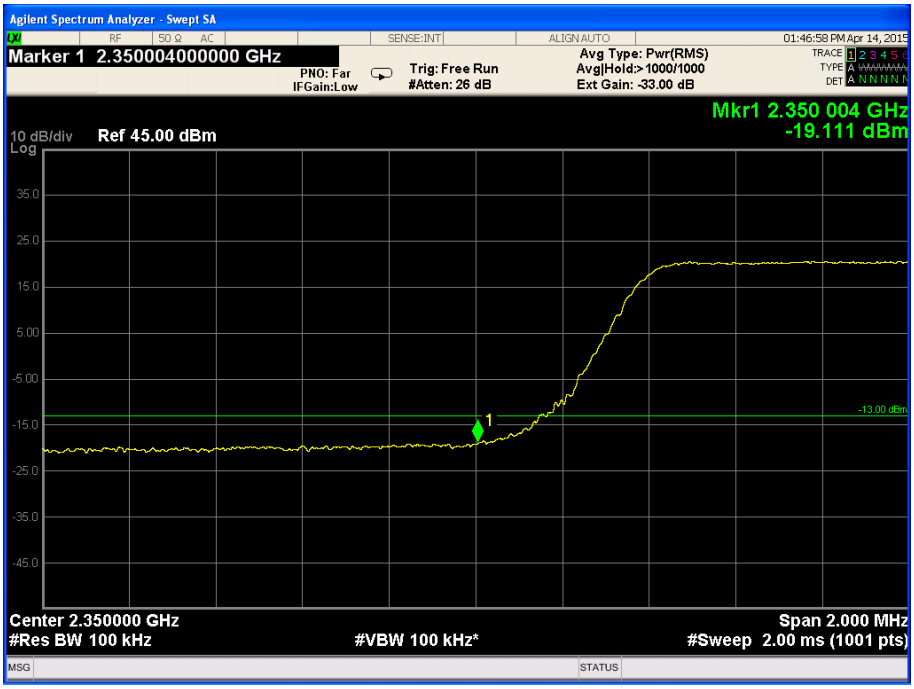


Figure 99. — QPSK - Operating Freq.: 2355.0MHz, BW: 10MHz, Low Band Edge

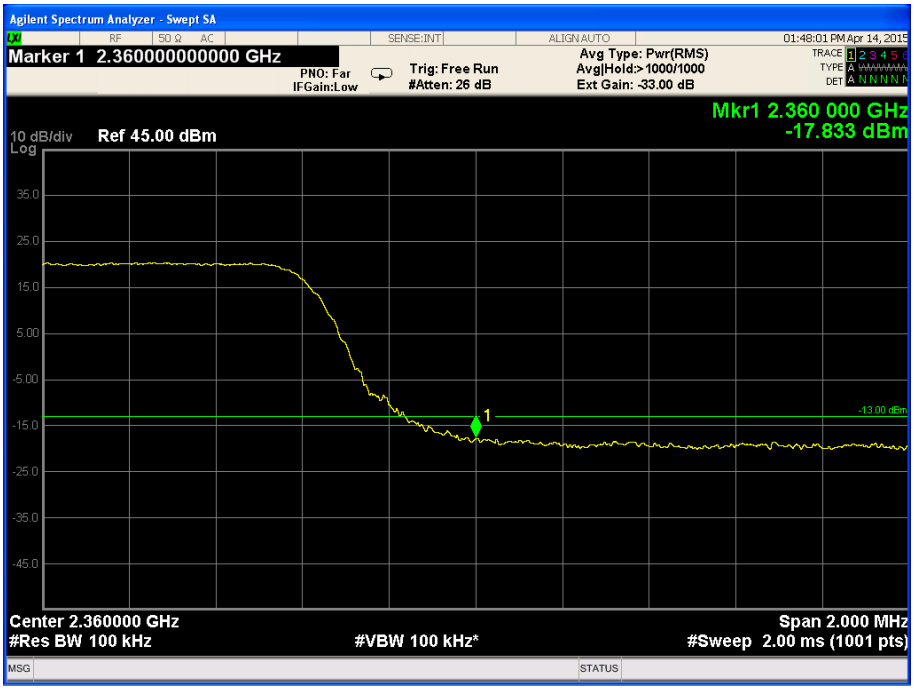


Figure 100. — QPSK - Operating Freq.: 2355.0MHz, BW: 10MHz, High Band Edge

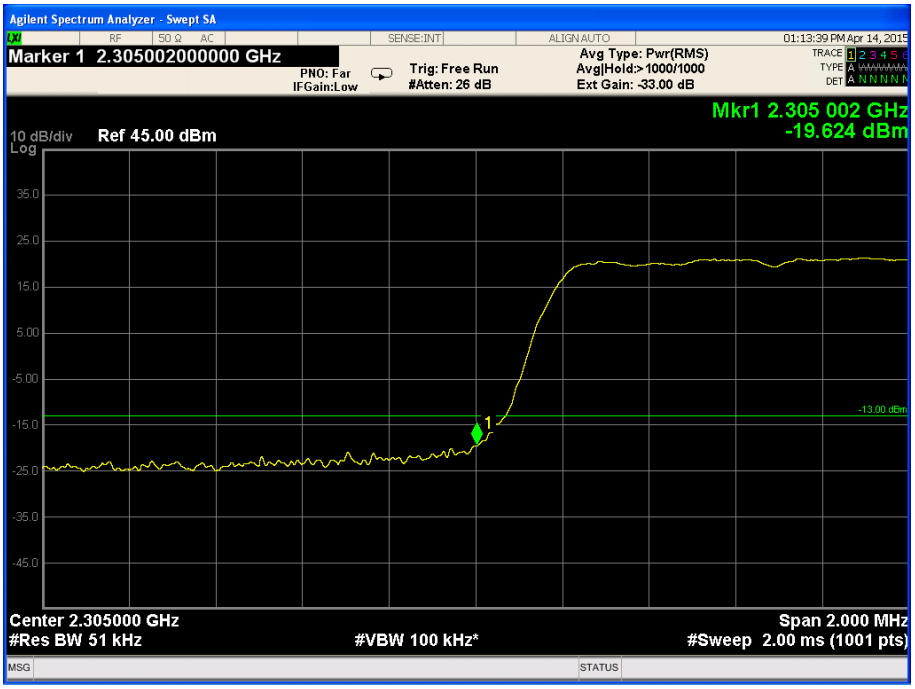


Figure 101. — 16QAM - Operating Freq.: 2307.5MHz, BW: 5MHz, Low Band Edge

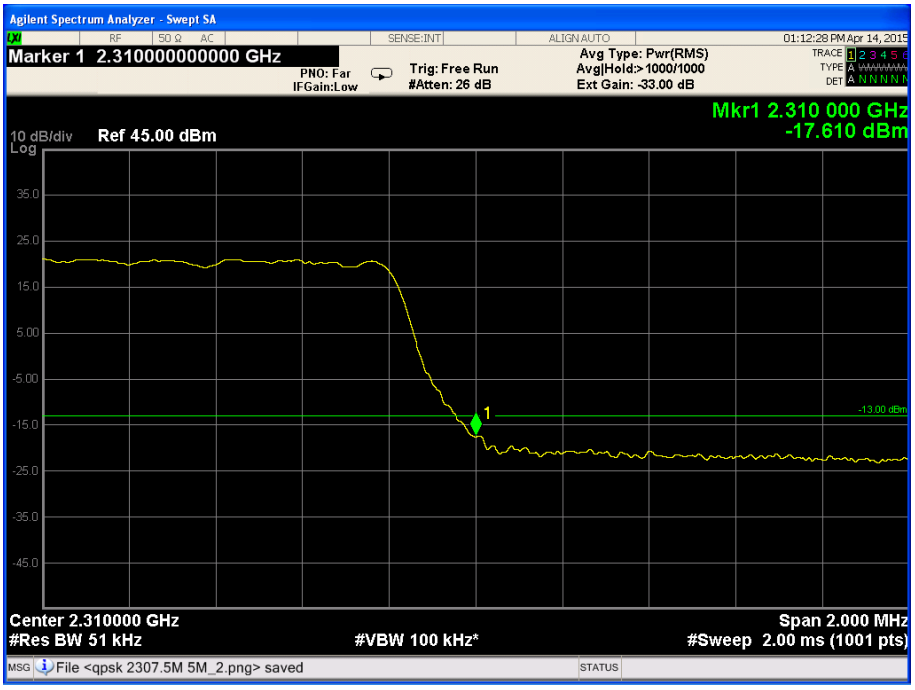


Figure 102. — 16QAM - Operating Freq.: 2307.5MHz, BW: 5MHz, High Band Edge

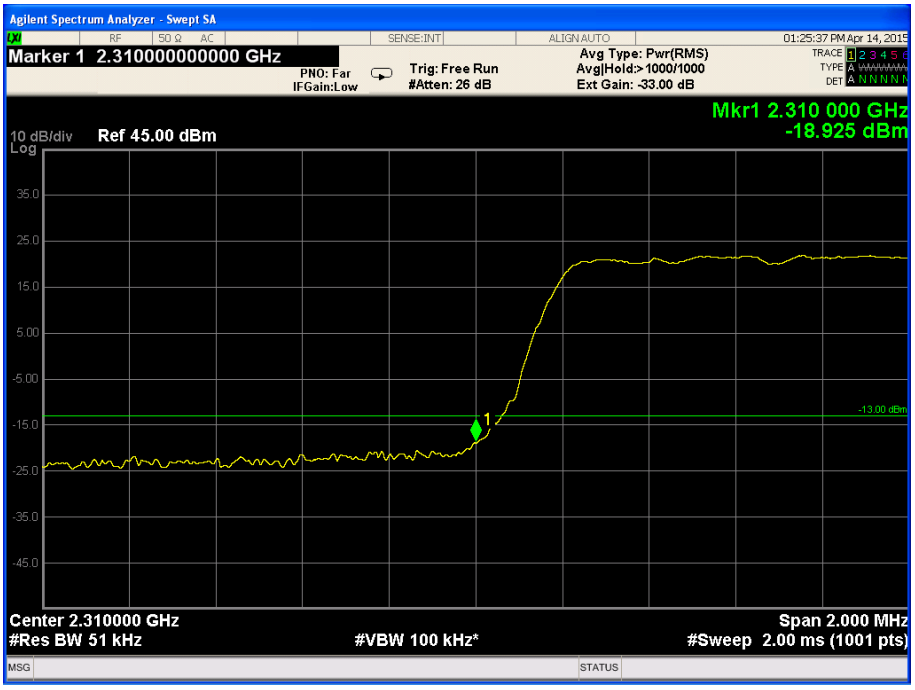


Figure 103. — 16QAM - Operating Freq.: 2312.5MHz, BW: 5MHz, Low Band Edge

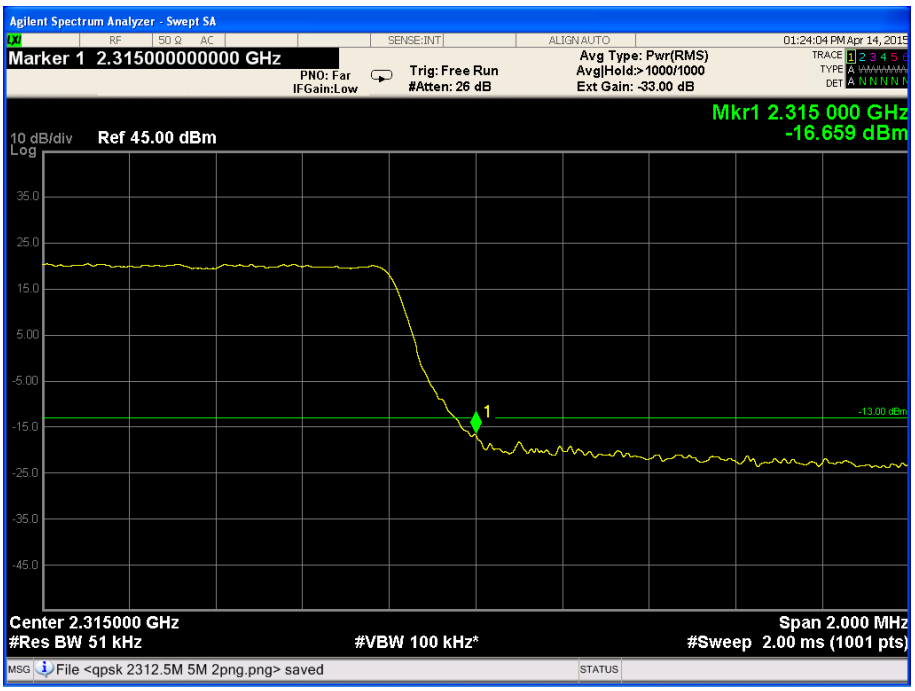


Figure 104. — 16QAM - Operating Freq.: 2312.5MHz, BW: 5MHz, High Band Edge

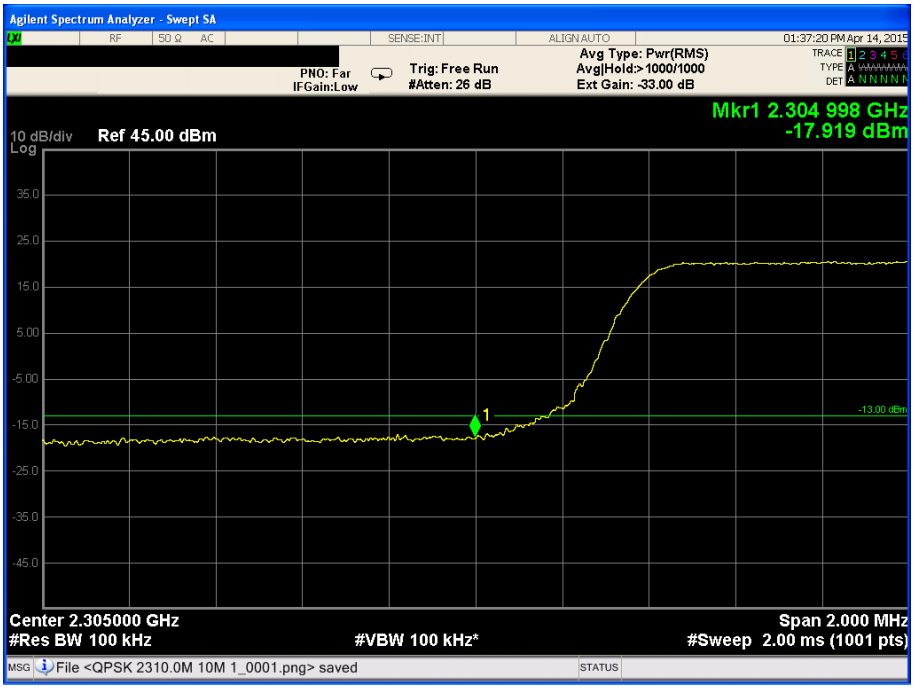


Figure 105. — 16QAM - Operating Freq.: 2310.0MHz, BW: 10MHz, Low Band Edge

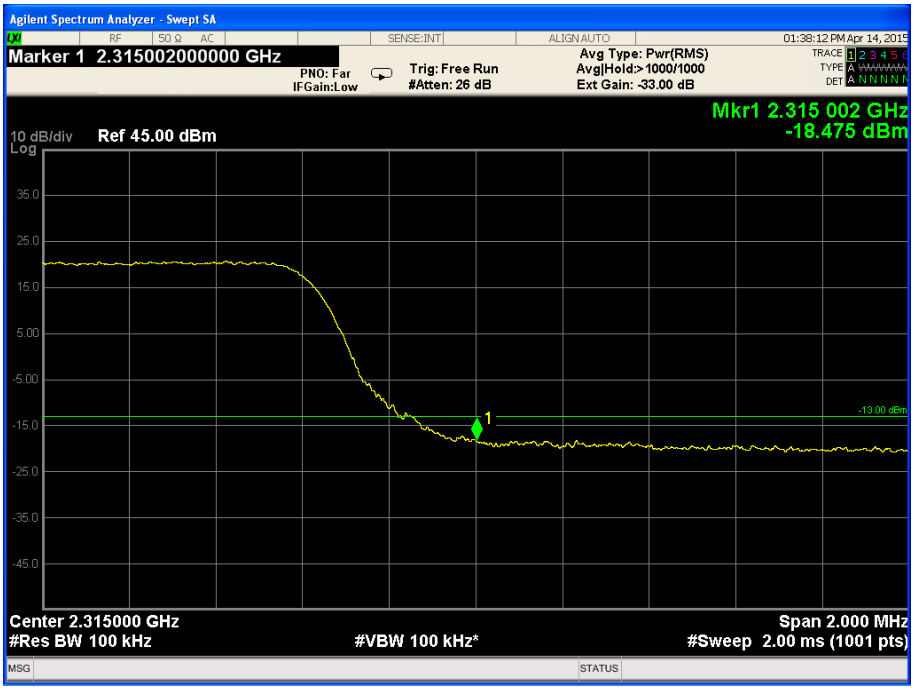


Figure 106. — 16QAM - Operating Freq.: 2310.5MHz, BW: 10MHz, High Band Edge

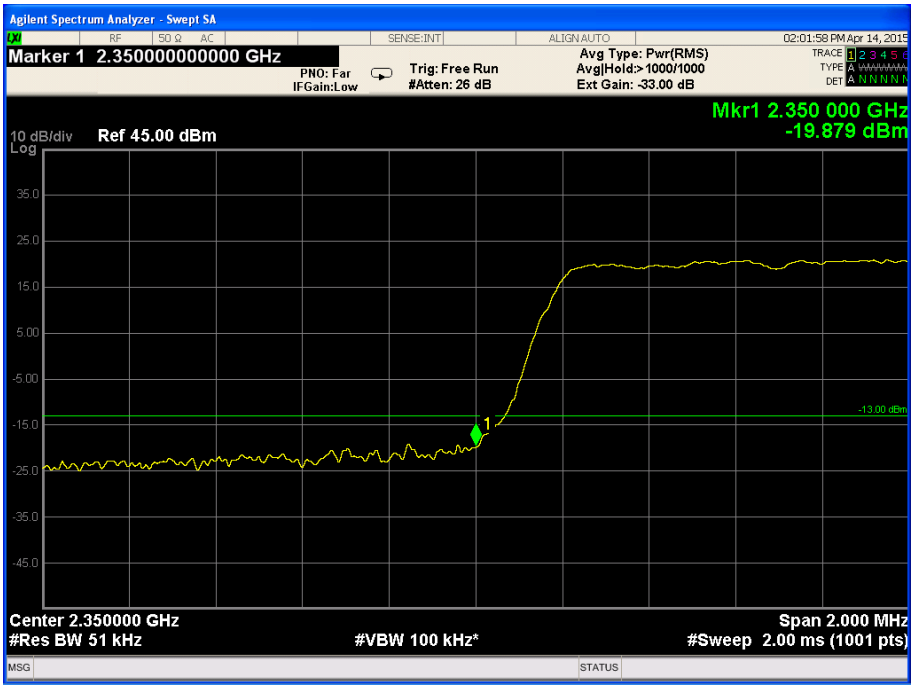


Figure 107. — 16QAM - Operating Freq.: 2352.5.5MHz, BW: 5MHz, Low Band Edge

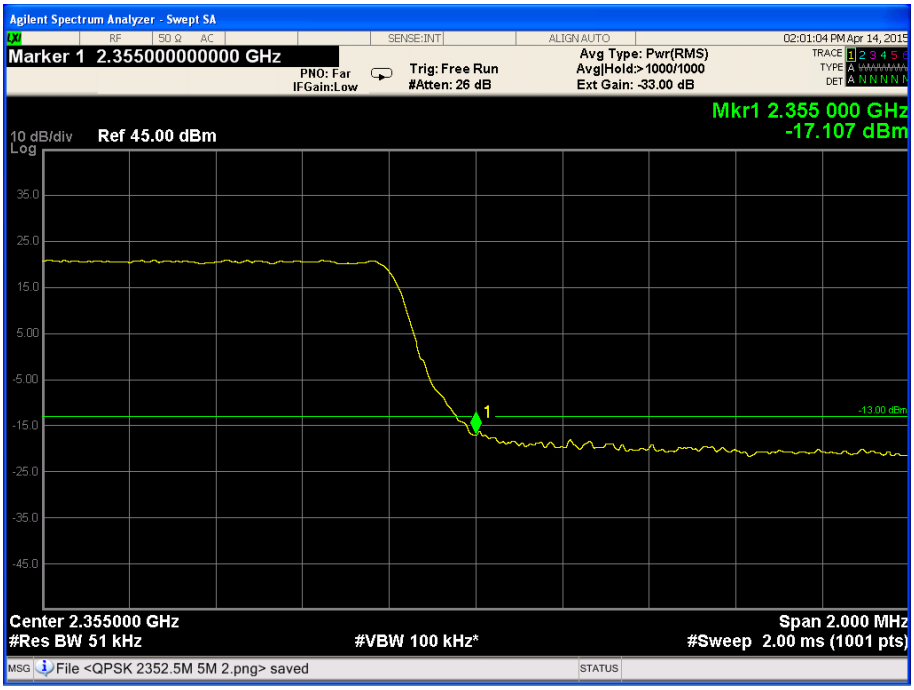


Figure 108. — 16QAM - Operating Freq.: 2352.5MHz, BW: 5MHz, High Band Edge

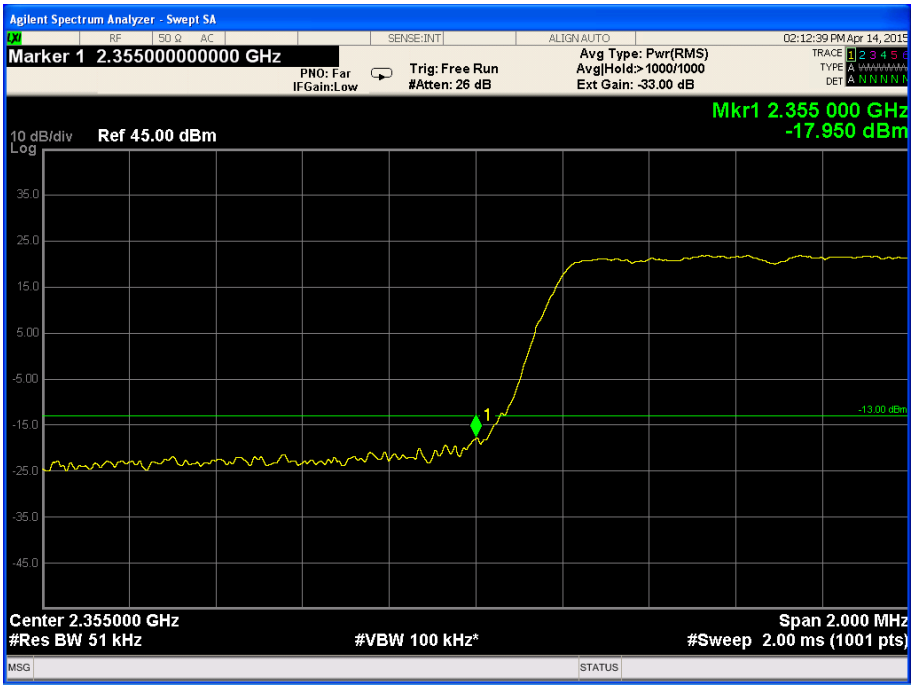


Figure 109. — 16QAM - Operating Freq.: 2357.5MHz, BW: 5MHz, Low Band Edge

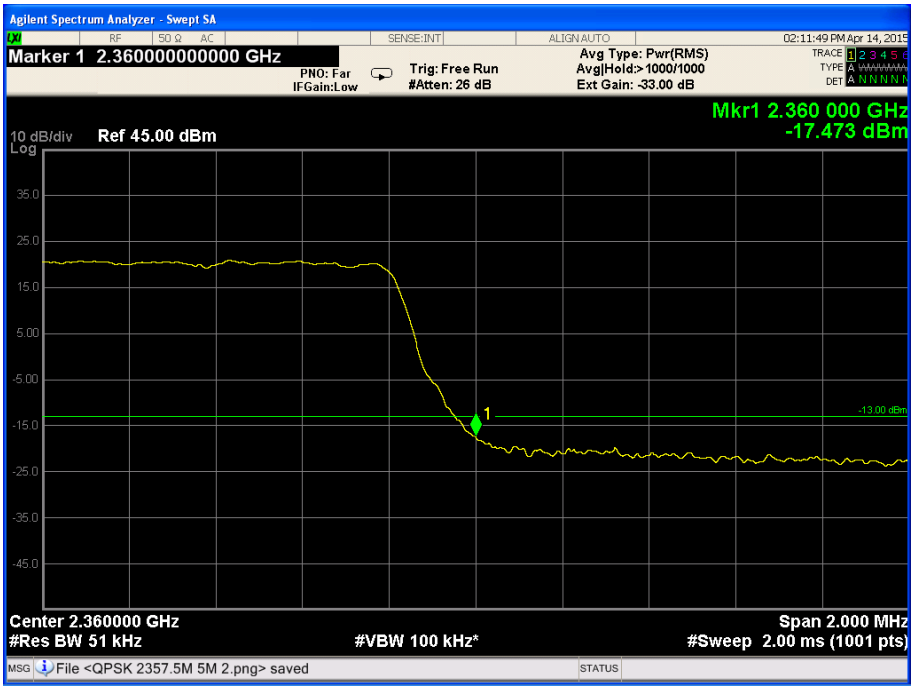


Figure 110. — 16QAM - Operating Freq.: 2357.5MHz, BW: 5MHz, High Band Edge

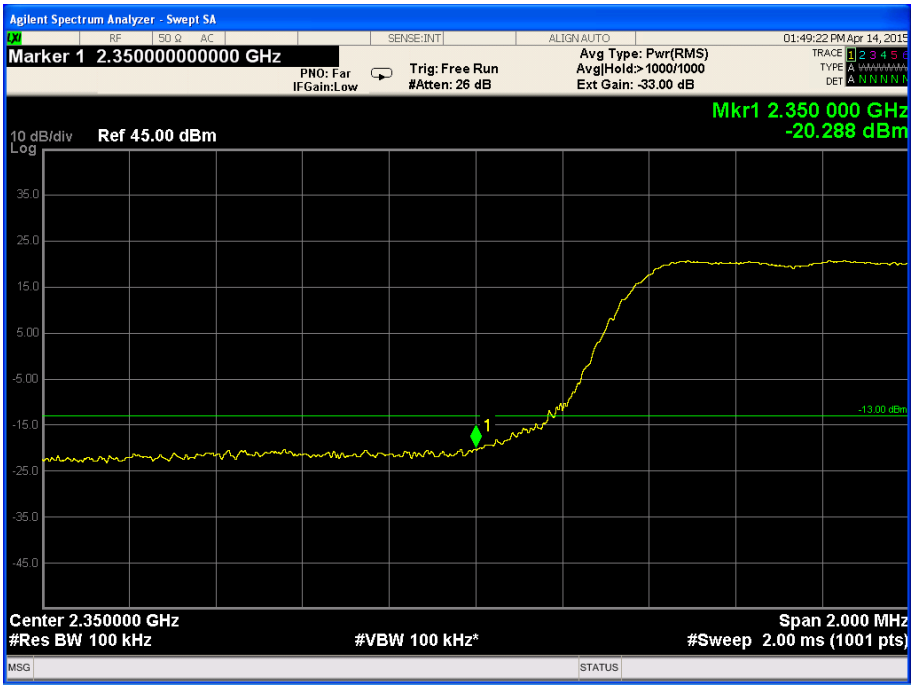


Figure 111. — 16QAM - Operating Freq.: 2355.0MHz, BW: 10MHz, Low Band Edge

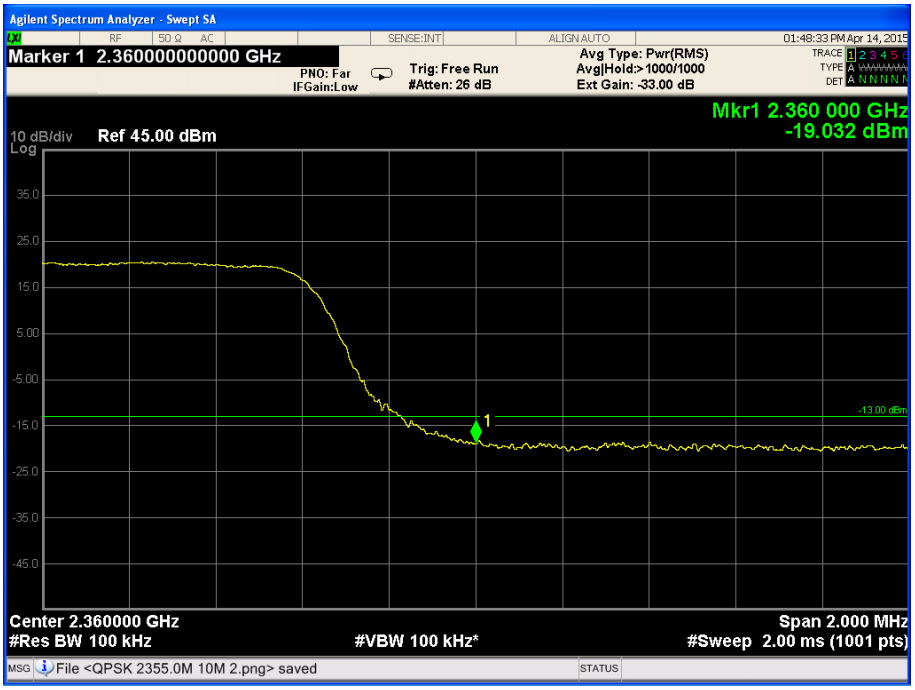


Figure 112. — 16QAM - Operating Freq.: 2355.0MHz, BW: 10MHz, High Band Edge

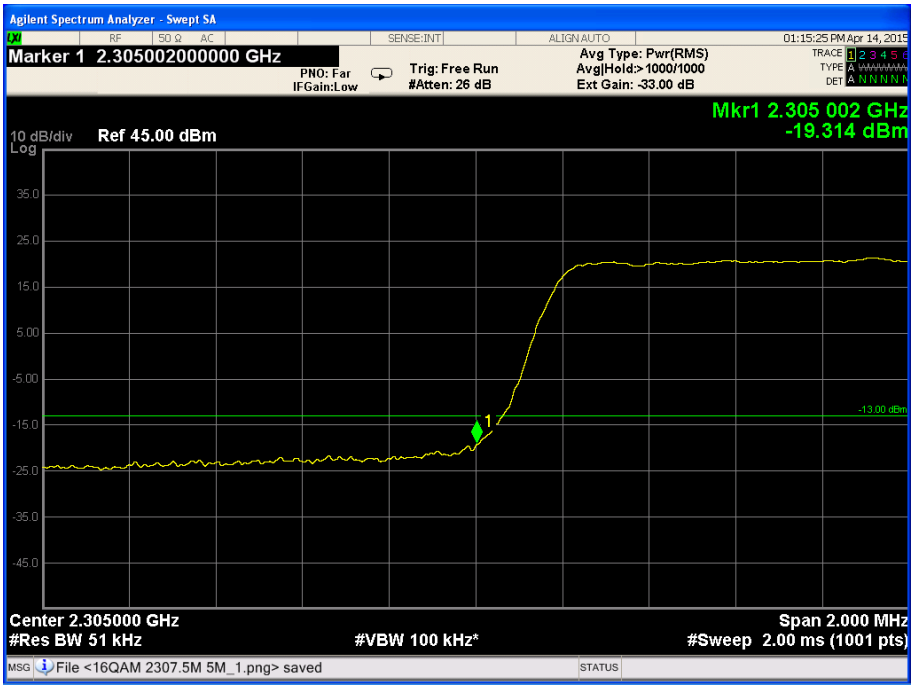


Figure 113. — 64QAM - Operating Freq.: 2307.5MHz, BW: 5MHz, Low Band Edge

Figure 114. — 64QAM - Operating Freq.: 2307.5MHz, BW: 5MHz, High Band Edge

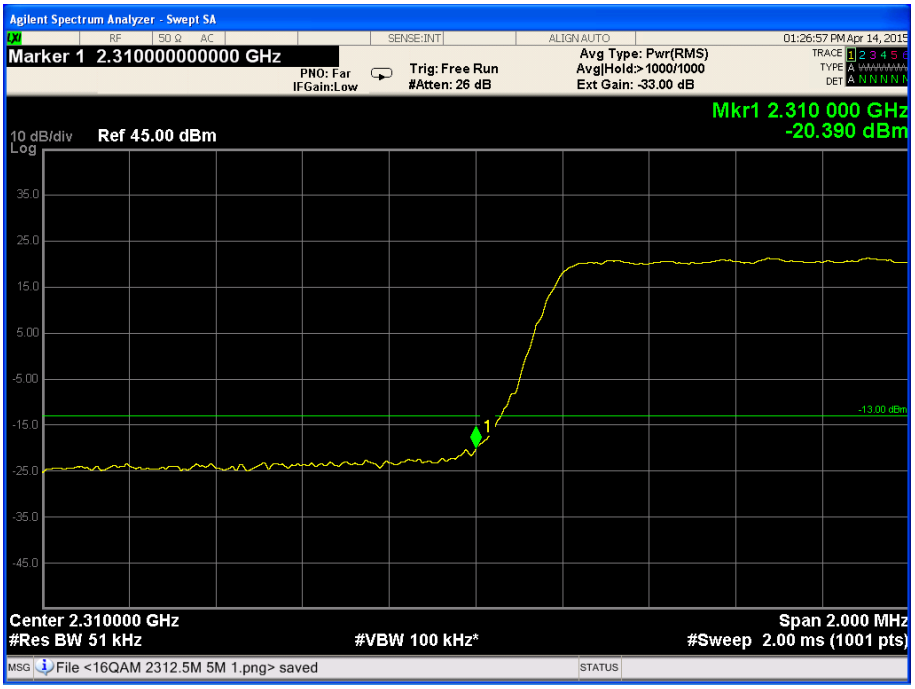


Figure 115. — 64QAM - Operating Freq.: 2312.5MHz, BW: 5MHz, Low Band Edge

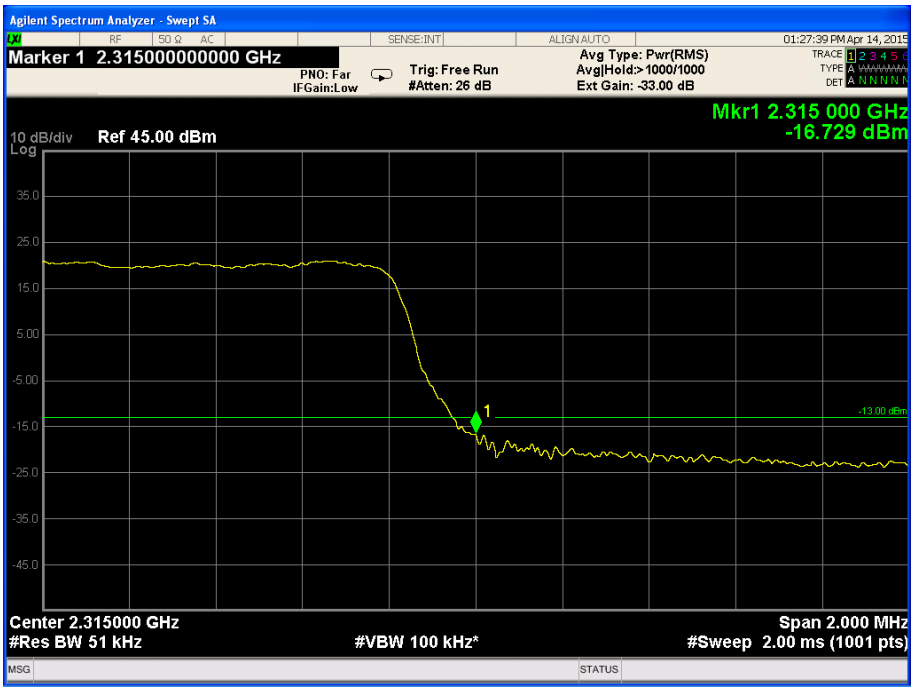


Figure 116. — 64QAM - Operating Freq.: 2312.5MHz, BW: 5MHz, High Band Edge

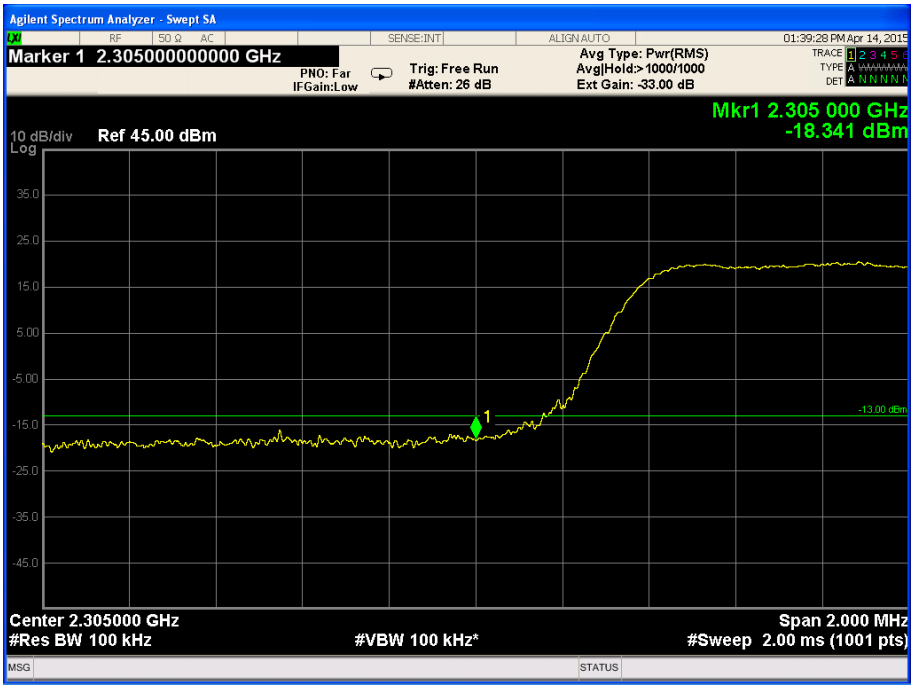


Figure 117. — 64QAM - Operating Freq.: 2310.0MHz, BW: 10MHz, Low Band Edge

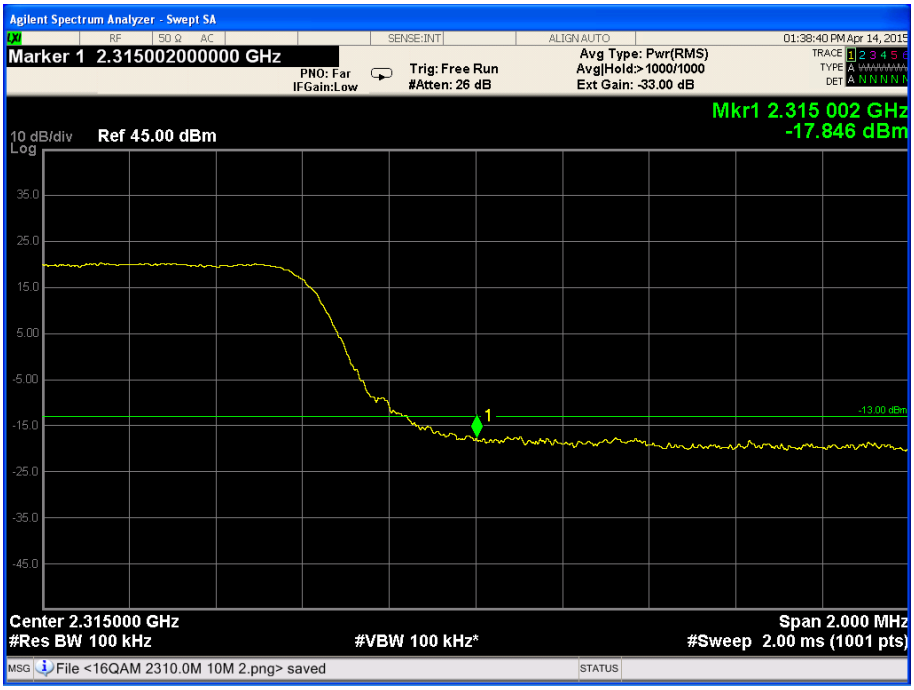


Figure 118. — 64QAM - Operating Freq.: 2310.5MHz, BW: 10MHz, High Band Edge

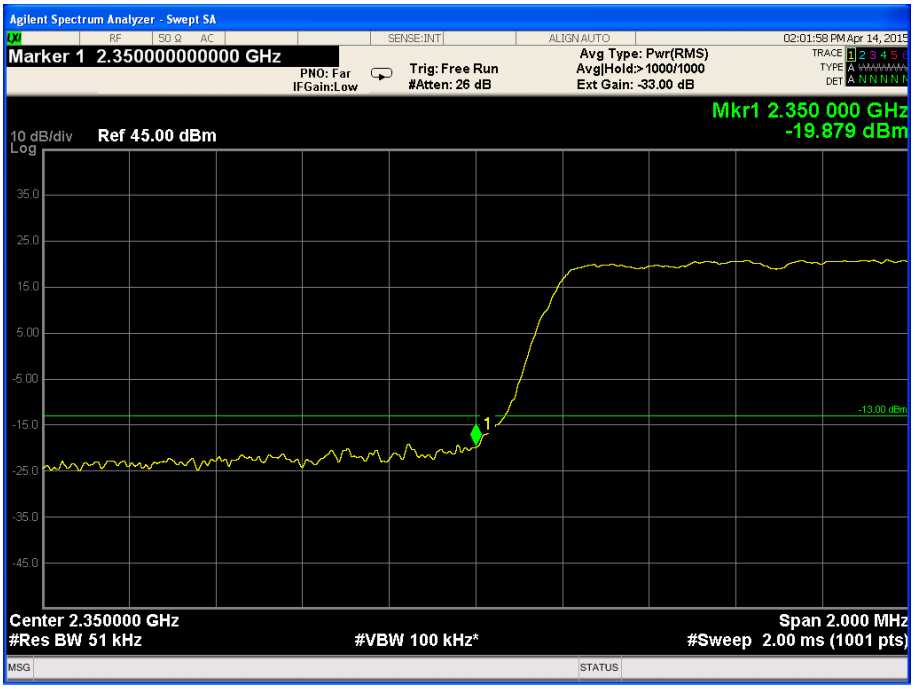


Figure 119. — 64QAM - Operating Freq.: 2352.5.5MHz, BW: 5MHz, Low Band Edge

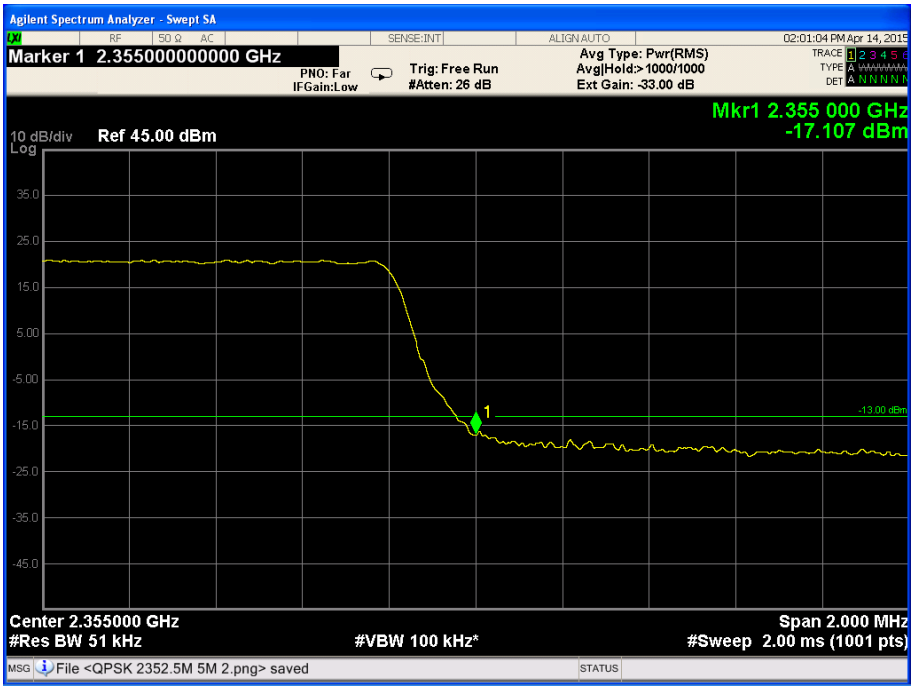


Figure 120. — 64QAM - Operating Freq.: 2352.5MHz, BW: 5MHz, High Band Edge

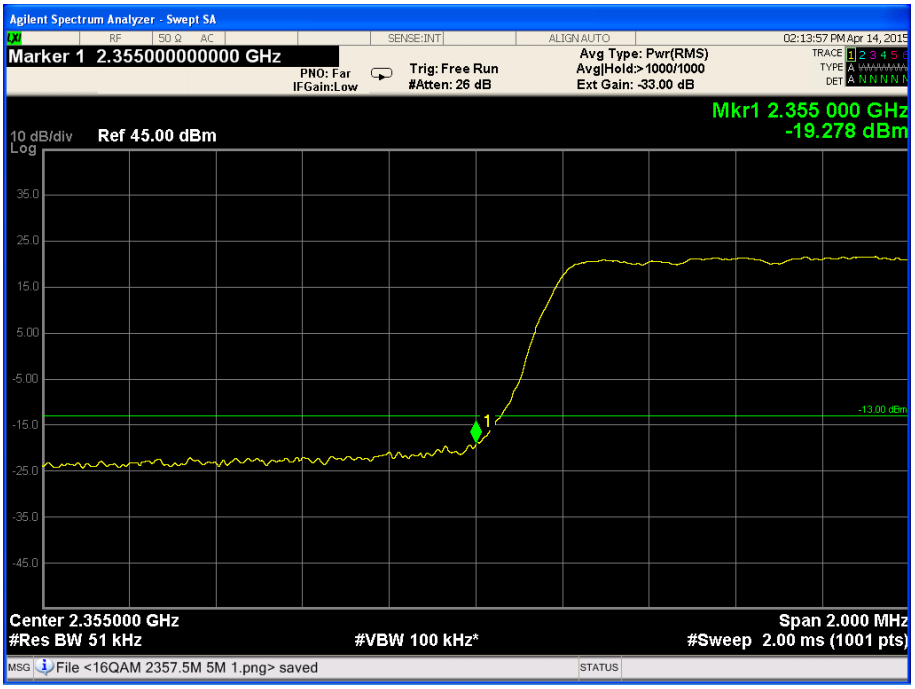


Figure 121. — 64QAM - Operating Freq.: 2357.5MHz, BW: 5MHz, Low Band Edge

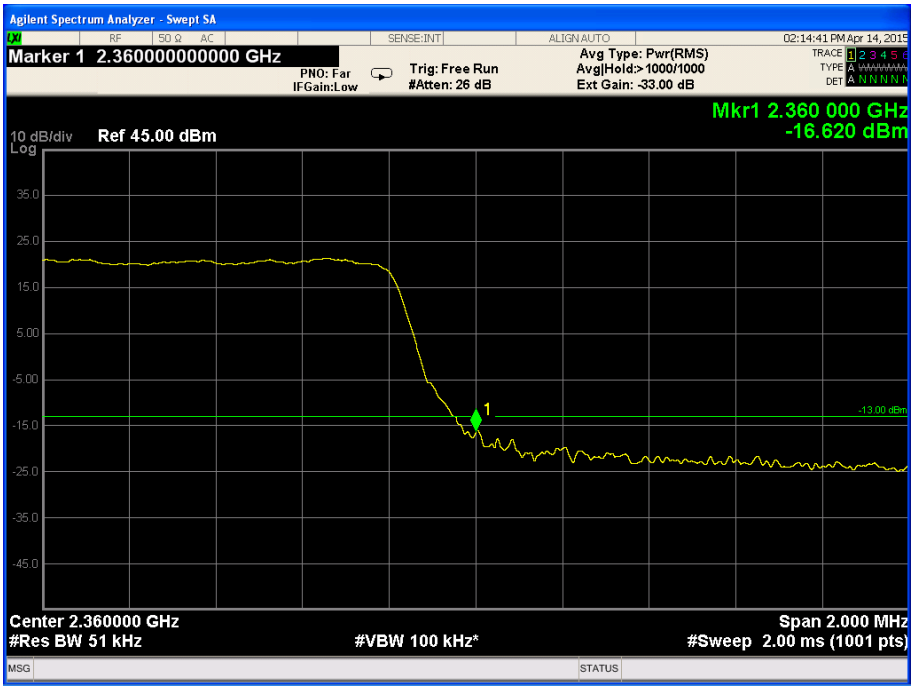


Figure 122. — 64QAM - Operating Freq.: 2357.5MHz, BW: 5MHz, High Band Edge

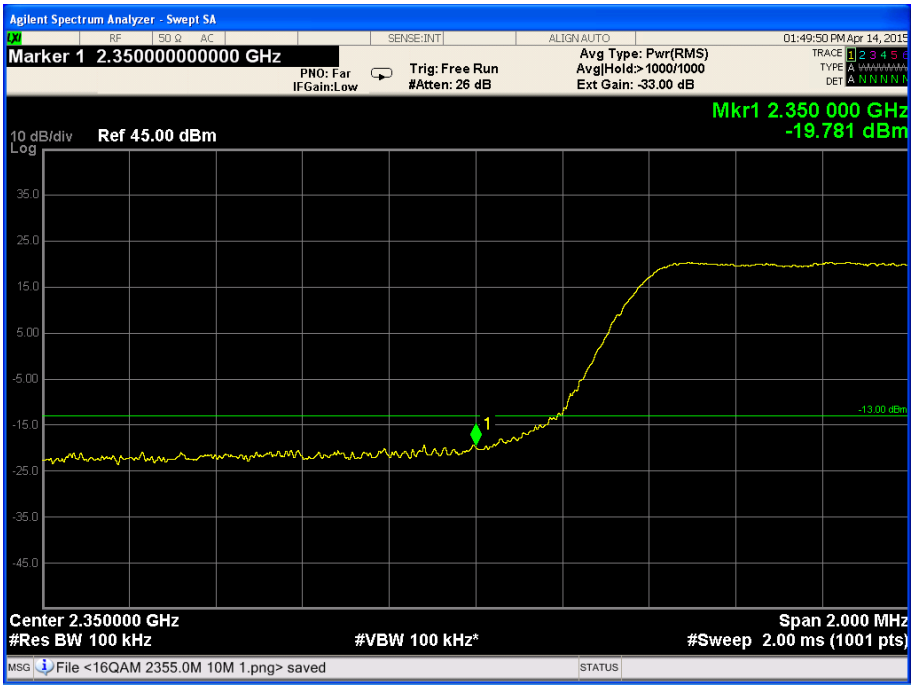


Figure 123. — 64QAM - Operating Freq.: 2355.0MHz, BW: 10MHz, Low Band Edge

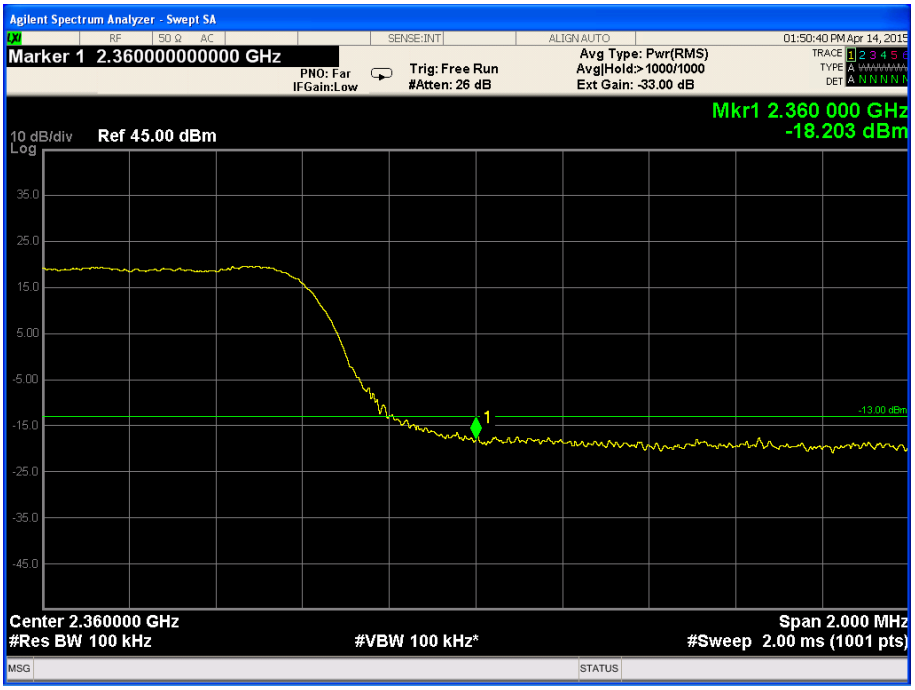


Figure 124. — 64QAM - Operating Freq.: 2355.0MHz, BW: 10MHz, High Band Edge

9.4 Test Equipment Used; Band Edge Spectrum

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	R&S	ESIB7	100120	January 4, 2015	1 year
Spectrum Analyzer	R&S	FSL6	100194	January 1, 2015	1 year
Spectrum Analyzer	HP	8592L	3826A01204	March 4, 2015	1 year
Active Loop Antenna	EMCO	6502	2950	November 4, 2014	1 year
Biconical Log Antenna	EMCO	3142B	1078	May 22, 2014	2 years
Horn Antenna	ETS	3115	6142	March 14, 2012	3 years*
Horn Antenna	A.R.A	SWH-28	1007	March 30, 2014	2 years
D.C Block	JFW	50DB-007	1-23	N/A	N/A
Coupler	PULSAR	CS 10-05-436	10	N/A	N/A
Notch Filter	TELRAD	RMC2310_2355 D10M08	10050150	N/A	N/A
MXA Signal Analyzer	Agilent	N9020A	MY46471581	February 12 2015	2 years
Spectrum Analyzer	HP	8563E	3810A8846	November 30, 2014	1 year
10 dB Attenuator	Weinschel	33-10-34	BZ5739	N/A	N/A
5 dB Attenuator	Mini-circuits	VAT-5+	15542	N/A	N/A
Power Splitter	Mini-circuits	ZN2PD-63-S+	F442300839	N/A	N/A
Attenuator	Weinschel	24-20-34	BZ144	N/A	N/A
Attenuator	Weinschel	24-20-34	BY0842	N/A	N/A
Attenuator	Weinschel	24-20-34	BY0855	N/A	N/A
Attenuator	Weinschel	24-20-34	BY0842	N/A	N/A
Signal Generator	WILTRON	6747B	278007	October 23, 2014	1 year

Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	August 29, 2014	1 year
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	August 22, 2014	1 year
Environmental Chamber	THERMOTRON CORP	SM 32C Mini Max	25-1030	February 24, 2015	1 year
Antenna Mast	ETS	2070-2	-	N/A	N/A
Turntable	ETS	2087	-	N/A	N/A
Mast & Table Controller	ETS/EMCO	2090	9608-1456	N/A	N/A

*Note – Extended to May 19, 2015

Figure 125 Test Equipment Used

10. Spurious Emissions (Radiated)

10.1 Test Specification

FCC Part 27.53

RSS-195, Issue 2, April 2014, Sections 4.2, 5.6.1

RSS-Gen, Issue 4, November 2014, Section 6.13

10.2 Test Procedure

The test method was based on ANSI/TIA-603-C: 2004, Section 2.2.12 Unwanted Emissions: Radiated Spurious.

(a) The E.U.T. operation mode and test set-up are as described in Section 3. A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The configuration tested is shown in *Figure 2*.
The frequency range 9 kHz-24 GHz was scanned and the list of the highest emissions was verified and updated accordingly.
The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.
The emissions were measured at a distance of 3 meters.

(b) The E.U.T. was replaced by a substitution antenna (dipole 30MHz-1GHz, Horn Antenna above 1GHz) driven by a signal generator. The height was readjusted for maximum reading. The signal generator level was adjusted to obtain the same reading on the EMI receiver as in step (a).
The signals observed in step (a) were converted to radiated power using:
P_d(dBm) = P_g(dBm) – Cable Loss (dB) + Substitution Antenna Gain (dB)
P_d = Dipole equivalent power (result).
P_g = Signal generator output level.

AVERAGE trace was used +RMS detector for this test.

Frequency Band (MHz)	Calculated Factor (dBc)
f<2285.0	75+10*log(10.5)=85.2
2285.0MHz<f<2287.5MHz	72+10*log(10.5)=82.2
2287.5MHz<f<2300.0MHz	70+10*log(10.5)=80.2
2300.0MHz<f<2305.0MHz	43+10*log(10.5)=53.2
2305.0MHz<f<2320.0MHz	43+10*log(10.5)=53.2
2320.0MHz<f<2345.0MHz	75+10*log(10.5)=85.2
2345.0MHz<f<2360.0MHz	43+10*log(10.5)=53.2
2360.0MHz<f<2362.50MHz	43+10*log(10.5)=53.2
2362.5MHz<f<2365.0MHz	55+10*log(10.5)=65.2
2365.0MHz<f<2367.5MHz	70+10*log(10.5)=80.2
2367.5MHz<f<2370.0MHz	72+10*log(10.5)=82.2
2370.0<f	75+10*log(10.5)=85.2

Figure 126 Mask Limit Table

10.3 Test Results

Operating Frequency (MHz)	Freq. (MHz)	Antenna Pol.	Maximum Peak Level (dBµV/m)	Signal Generator RF Output (dBm)	Cable Loss (dB)	Antenna Gain (dBd)	EIRP (dBm)	Spec.* (dBm)	Margin (dB)
2310.0	4620.0	V	48.8	-46.2	12.1	7.8	-50.5	-45.0	-5.5
	4620.0	H	48.3	-45.4	12.1	8.7	-48.8	-45.0	-3.8
2312.5	4625.0	V	52.2	-43.2	12.1	7.8	-47.5	-45.0	-2.5
	4625.0	H	51.5	-44.9	12.1	8.7	-48.3	-45.0	-3.3
2357.5	4715.0	V	52.5	-43.4	12.1	7.8	-47.7	-45.0	-2.7
	4715.0	H	51.9	-44.5	12.1	8.7	-47.9	-45.0	-2.9
2355.0	4710.0	V	50.8	-43.8	12.1	7.8	-48.1	-45.0	-3.1
	4710.0	H	50.1	-44.9	12.1	8.7	-48.3	-45.0	-3.3

***Note - Limit calculation for freq>2370.0MHz: factor=75+10*log(10.5)=85.2dBc**
Limit=40.2-85.2=-45.0dBm

Figure 127 Spurious Emission (Radiated)

The E.U.T met the requirements of the FCC Part 27.53; RSS-195, Issue 2, April 2014, Sections 4.2, 5.6.1 and RSS-Gen, Issue 4, November 2014, Section 6.13

JUDGEMENT; Passed by 2.5 dB

10.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	R&S	ESIB7	100120	January 4, 2015	1 year
Spectrum Analyzer	R&S	FSL6	100194	January 1, 2015	1 year
Spectrum Analyzer	HP	8592L	3826A01204	March 4, 2015	1 year
Active Loop Antenna	EMCO	6502	2950	November 4, 2014	1 year
Biconical Log Antenna	EMCO	3142B	1078	May 22, 2014	2 years
Horn Antenna	ETS	3115	6142	March 14, 2012	3 years*
Horn Antenna	A.R.A	SWH-28	1007	March 30, 2014	2 years
D.C Block	JFW	50DB-007	1-23	N/A	N/A
Coupler	PULSAR	CS 10-05-436	10	N/A	N/A
Notch Filter	TELRAD	RMC2310_2355 D10M08	10050150	N/A	N/A
MXA Signal Analyzer	Agilent	N9020A	MY46471581	February 12 2015	2 years
Spectrum Analyzer	HP	8563E	3810A8846	November 30, 2014	1 year
10 dB Attenuator	Weinschel	33-10-34	BZ5739	N/A	N/A
5 dB Attenuator	Mini-circuits	VAT-5+	15542	N/A	N/A
Power Splitter	Mini-circuits	ZN2PD-63-S+	F442300839	N/A	N/A
Attenuator	Weinschel	24-20-34	BZ144	N/A	N/A
Attenuator	Weinschel	24-20-34	BY0842	N/A	N/A
Attenuator	Weinschel	24-20-34	BY0855	N/A	N/A
Attenuator	Weinschel	24-20-34	BY0842	N/A	N/A
Signal Generator	WILTRON	6747B	278007	October 23, 2014	1 year

Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	August 29, 2014	1 year
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	August 22, 2014	1 year
Environmental Chamber	THERMOTRON CORP	SM 32C Mini Max	25-1030	February 24, 2015	1 year
Antenna Mast	ETS	2070-2	-	N/A	N/A
Turntable	ETS	2087	-	N/A	N/A
Mast & Table Controller	ETS/EMCO	2090	9608-1456	N/A	N/A

*Note – Extended to May 19, 2015

Figure 128 Test Equipment Used

11. Frequency Stability 5 and 10 MHz Bandwidth

11.1 Test Specification

FCC Part 27, Sub-Part C, Section 27.54
RSS 195 Issue 2 April 2014, Section 5.4
RSS Gen Issue 4, November 2014, Section 6.11

11.2 Test Procedure

The E.U.T operation mode and test setup are as described in Section 2. The E.U.T. was operated with a CW signal in the downlink path.

The E.U.T. was placed inside a temperature chamber. The E.U.T. was operated from 40, 48 and 55 VDC at normal temperature and the chamber temperature was set to +25°C.

The spectrum analyzer was set to 10.0 kHz span and 1.0 kHz RBW, and 1.0 kHz VBW.

The carrier frequency was measured and recorded (reference frequency reading).

The carrier frequency measurement was repeated for:

(a). -30°C and 48 VDC
(b). -20°C and 48 VDC
(c). -10°C and 48 VDC
(d). 0°C and 48 VDC
(e). +10°C and 48 VDC
(f). +20°C and 48 VDC
(g). +40°C and 48 VDC
(h). +50°C and 48 VDC

The carrier frequency was measured and recorded after at least 20 minutes of exposing the E.U.T. to the temperature.

The E.U.T. was operated at and 10MHz for 5 MHz bandwidth in each operation band (2305MHz-2320MHz and 2345MHz-2360MHz).

11.3 Test Results

The E.U.T met the requirements of Part 27 Sub-part C, Section 27.54, RSS Gen Issue 4, November 2014, Section 6.11 and RSS 195 Issue 2, April 2014, Section 5.4 specification.

The details of the results are given in *Figure 306.*

JUDGEMENT: Passed

Frequency Stability

E.U.T Description	BreezeCompact 3000 Base Station
Type	CMP3000-B40-2300-2400MHz
Part Number:	Not designated

Specification: FCC Part 27 Sub-part C Section 27.54

		5 MHz Bandwidth				10 MHz Bandwidth	
Temperature (°C)	**Voltage** (VDC)	**Frequency** (MHz)	**Frequency** (MHz)	**Frequency** (MHz)	**Frequency** (MHz)	**Frequency** (MHz)	**Frequency** (MHz)
		2307.50000	2312.50000	2352.50000	2357.50000	2310.0000	2355.0000
25	40	2307.50009	2312.50009	2352.50009	2357.50008	2310.0008	2355.0008
	48	2307.50009	2312.50008	2352.50009	2357.50008	2310.0008	2355.0008
	55	2307.50009	2312.50008	2352.50009	2357.50008	2310.0008	2355.0008
-30	48	2307.50008	2312.50008	2352.50009	2357.50007	2310.0008	2355.0008
-20	48	2307.50008	2312.50008	2352.50009	2357.50007	2310.0008	2355.0008
-10	48	2307.50009	2312.50008	2352.50009	2357.50008	2310.0008	2355.0008
0	48	2307.50009	2312.50008	2352.50009	2357.50008	2310.0008	2355.0008
+10	48	2307.50009	2312.50008	2352.50009	2357.50009	2310.0008	2355.0008
+20	48	2307.50009	2312.50008	2352.50009	2357.50009	2310.0008	2355.0008
+40	48	2307.50009	2312.50008	2352.50009	2357.50008	2310.0008	2355.0008
+50	48	2307.50009	2312.50008	2352.50009	2357.50008	2310.0008	2355.0007

Figure 129 Frequency Stability Test Results Table

11.4 Test Instruments Used; Frequency Stability 5MHz & 10MHz Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration	Period
Spectrum Analyzer	R&S	FSL6	100194	January 1, 2015	1 year
Environmental Chamber	THERMOTRON CORP	SM 32C Mini Max	25-1030	February 24, 2015	1 year
Calibration Meter	Mastech	MS-7212	00A386	February 25, 2015	1 year
Digital Voltage Meter	Escort	EDM1111A	10313121	February 16, 2015	1 year

Figure 130 Test Instruments Used Frequency Stability 5 MHz & 10 MHz Bandwidth

12. ANTENNA INFORMATION

Product Data Sheet **TLLPX310M-E**

2300-2700MHz Manual Tilt Panel Antenna

Electrical Specifications

Frequency Range	2300 - 2700 MHz / 2300 - 2700 MHz
Gain	17.3 dBi 2.4 GHz, 18.0 dBi 2.6 GHz
Return Loss	> 15 dB
Polarization	Dual Slant ± 45°
Horizontal Beamwidth	65°
Vertical Beamwidth	6.5° with nullfill
Electrical Downtilt	0° - 10° independently continuously adjustable
Upper Sidelobe Level	< -15 dB
Front to Back Ratio	> 25 dB
Isolation Between Ports	> 30 dB
Power Rating	250W
Impedance	50 ohm
Lightning Protection	DC grounded
Connector Type	N-Type female

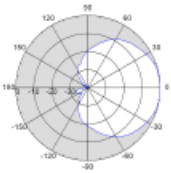
Mechanical Specifications

Antenna Dimensions	1070x300x115 mm
Packed Dimensions	1200x330x200 mm
Antenna Weight	12.5 kg
Radome Material	Polyester Fibreglass or UVPVC

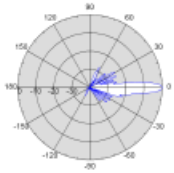
Maximum Environmental Ratings

Humidity	95% RH @ +30°C
Lateral Loading (Front)	0.45 kN @ 160 km/h
Lateral Loading (Rear)	0.48 kN @ 160 km/h
Rain	140mm per hour
Rated Wind Velocity	200 km/h
Temperature	-40°C to +70°C

Mounting Options		Product Options	
F-042-GL-E	Fixed Clamps	TLLPX310M-E1	Polyester Fibreglass
T-045-GL-E	Adjustable Clamps	TLLPX310M-E2	UVPVC



Azimuth



Elevation

Last Updated: 31-07-2009

Telrad

Date May 7, 2015

DECLARATION

I hereby declare that the antenna gain for the Base Station model no: CMP3000-B40-2300-2400MHz that was tested between 13.04.2015-20.04.2015 at I.T.L. is calculated as follows:

18 dBi (antenna gain) – 1.9 dBi (insertion loss notch filter -0.5 dBi (cable loss) = 15.6 dBi total gain

Thank you,
Signature: _____
Printed Name: Klara Milman_____
(Place official title here) Project Manager

13. APPENDIX A - CORRECTION FACTORS

13.1 Correction factors for Horn ANTENNA

Model: SWH-28
Antenna serial number: 1007
1 meter range

FREQUENCY	Antenna Factor
(MHz)	(dB/m)
18000	**33.0**
18500	**32.9**
19000	**33.1**
19500	**33.3**
20000	**33.6**
20500	**33.6**
21000	**33.4**
21500	**33.8**
22000	**33.7**
22500	**33.9**
23000	**34.8**
23500	**34.5**
24000	**34.2**
24500	**34.8**
25000	**34.4**
25500	**35.2**
26000	**35.9**
26500	**36.0**

13.2 Correction factors for ACTIVE LOOP ANTENNA

Model 6502
S/N 9506-2950

FREQUENCY (MHz)	Magnetic Antenna Factor (dB)	Electric Antenna Factor (dB)
.009	-35.1	16.4
.010	-35.7	15.8
.020	-38.5	13.0
.050	-39.6	11.9
.075	-39.8	11.8
.100	-40.0	11.6
.150	-40.0	11.5
.250	-40.0	11.6
.500	-40.0	11.5
.750	-40.1	11.5
1.000	-39.9	11.7
2.000	-39.5	12.0
3.000	-39.4	12.1
4.000	-39.7	11.9
5.000	-39.7	11.8
10.000	40.2	11.3
15.000	-40.7	10.8
20.000	-40.5	11.0
25.000	-41.3	10.2
30.000	42.3	9.2

14. Comparison Industry Canada Requirements With FCC

Telrad Networks Ltd.
M/N: CMP3000-B40-2300-2400MHz
IC: 899A-COMPACT23X FCC ID: ARA-COMPACT23X

Test	**FCC**	**RSS-195 Issue 2, April 2014**	**RSS-Gen, Issue 4, November 2014**	**Additional IC**
Transmitter Output Power	FCC Part 27.50 (a)(ii)	RSS-195 Issue 2 Sections 4.1, 5.5	Section 6.12	SRSP-516, Issue 1, April 2014, Section 5.1.1.2
Transmitter Unwanted Emission	FCC Part 27.53	Section 5.6	Section 6.13	
Frequency Stability	FCC Part 27, Section 27.54	Section 5.4	Section 6.11	
Transmitter Output Power and EIRP	FCC Part 27.50(a)(1)(A)	Section 5.5	Section 6.12	
Peak to Average Power Ratio (PAPR)	FCC Part 27.50(a)(1)(B)	Section 5.5.1		
RF Exposure Limits	1.1310			RSS 102, Issue 5 Section 2.5.2